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10/510941

10297.204.ST25.txt
SEQUENCE LISTING

<110> Novozymes A/S
Jørgensen, Steen Troels
Rasmussen, Michael Dolberg
Andersen, Jens Tønne
Olesen, Peter Bjarke
Clausen, Ib Groth

<120> Improved Bacillus Host Cell

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<170> PatentIn version 3.2

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 260 265 270

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 365 370 375

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 165 170 175

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 210 215 220

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 225 230 235 240

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 245 250 255

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 260 265 270

Ala Pro Asn Gly Glu Gly Gly Val Arg Ala Met Lys Glu Ala Ile Lys
 275 280 285

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 305 310 315 320

Val Phe Gly Glu His Ala Tyr Lys Leu Ala Val Ser Ser Thr Lys Ser
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 340 345 350

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80 85 90

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Ser Glu Thr Asp Pro Glu Gln Ala Lys Ser Trp Met Met Asp Asp
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Thr	Ser	Ser	Ser	Phe	Leu	Arg	Arg	Ser	Glu	His	Leu	Pro	Ser	Glu	Asp		
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Ala	Asp	Arg	Leu	Leu	Ser	Ala	Ala	Ser	Arg	Met	Gly	Ala	Thr	Trp	His		
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Ala	Asn	Asp	Val	Val	Leu	Gly	Met	Pro	Met	Met	Cys	Arg	Leu	Gly	Ser		
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Ala	Ala	Leu	His	Ile	Pro	Gly	Met	Val	Met	Asn	Leu	Leu	Pro	Leu	Arg		
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Ile	Gly	Met	Gln	Pro	Gln	Met	Ser	Ile	Gly	Glu	Leu	Val	Lys	Gln	Ile		
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Ser	Gly	Glu	Met	Met	Lys	Leu	Arg	Arg	His	Gln	His	Tyr	Arg	His	Glu		
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Glu	Leu	Arg	Arg	Asp	Leu	Lys	Leu	Leu	Gly	Glu	Asn	Gln	Arg	Leu	Phe		
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Arg	Glu	Asn	Met	Leu	Ala	Asp	Trp	Ser	Lys	Ser	Ser	Asn Ser Ile
	1500					1505					1510	5039
cct	tgt	tca	tct	ttg	ccc	gtt	ttg	ttt	gaa	aag	cag	gcg gca aag
Pro	Cys	Ser	Ser	Leu	Pro	Val	Leu	Phe	Glu	Lys	Gln	Ala Ala Lys
	1515					1520					1525	5084
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Asp	Pro	Glu	Ala	Val	Ala	Val	Ile	Cys	Glu	Asn	Asn	Ala Leu Thr
	1530					1535					1540	5129
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Tyr	Gly	Glu	Leu	Asn	Lys	Arg	Ala	Asn	Arg	Leu	Ala	His Leu Leu
	1545					1550					1555	5174
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Ile	Ala	Lys	Gly	Val	Gly	Pro	Glu	Gln	Phe	Ala	Ala	Leu Ala Leu
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Pro	Arg	Ser	Leu	Asp	Met	Val	Val	Gly	Leu	Leu	Ala	Val Leu Lys
	1575					1580					1585	5264
gct	ggc	gcg	gca	tat	gtg	ccc	cta	gat	ccg	gac	tac	ccg gcg gaa
Ala	Gly	Ala	Ala	Tyr	Val	Pro	Leu	Asp	Pro	Asp	Tyr	Pro Ala Glu
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agg	ata	gcg	ttt	atg	ttg	aat	gat	gcc	cat	cct	gtc	tgc atc gta
Arg	Ile	Ala	Phe	Met	Leu	Asn	Asp	Ala	His	Pro	Val	Cys Ile Val
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	1635					1640					1645	5444
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Leu	Leu	Pro	Leu	His	Pro	Ala	Tyr	Val	Ile	Tyr	Thr	Ser Gly Ser
	1665					1670					1675	5534
acc	ggc	aag	ccg	aaa	gga	gtc	gtt	gtt	ccg	cat	caa	aat gtc gtg
Thr	Gly	Lys	Pro	Lys	Gly	Val	Val	Val	Pro	His	Gln	Asn Val Val
	1680					1685					1690	5579
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Asp	Val	Trp	Thr	Met	Phe	His	Ser	Tyr	Ala	Phe	Asp	Phe	Ser	Val	
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Trp	Glu	Ile	Trp	Gly	Ala	Leu	Leu	Asn	Gly	Gly	Arg	Leu	Ile	Val	
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Val	Pro	His	Thr	Ile	Ser	Arg	Ser	Pro	Ala	Glu	Phe	Leu	Asn	Leu	
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Leu	Val	Arg	Glu	Gly	Val	Thr	Val	Leu	Asn	Gln	Thr	Pro	Ser	Ala	
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Lys	Leu	Leu	Ser	Leu	Arg	Phe	Ile	Ile	Phe	Gly	Gly	Glu	Ala	Leu	
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Glu	Met	Tyr	Val	Ser	Gly	Gly	Gly	Leu	Ala	Arg	Gly	Tyr	Leu	Gly	
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1965						1970					1975				
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Lys	Ala	Leu	Pro	Glu	Pro	Asp	Phe	Ala	Ala	Ala	Val	Lys	Gly	Arg	
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Gly	Pro	Arg	Thr	Pro	Gln	Glu	Glu	Ile	Leu	Cys	Asp	Leu	Phe	Ser	
2040						2045					2050				
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Pro	Asn	His	Phe	Leu	Pro	Ile	Lys	Asp	Ala	Pro	Asp	Glu	Gln	Glu		
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Arg	Arg	Asp	Gly	Ser	Ala	Leu	Ala	Ser	Leu	Asp	Glu	Ala	Ala	Ile		
	2280					2285					2290					
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Leu	Asn	Leu	Lys	Glu	Thr	Tyr	Val	Asn	Ser	Val	Arg	Ile	Leu	Ser		
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Gly	Arg	Arg	Val	Ser	Glu	Lys	Leu	Asp	Asp	Leu	Lys	Lys	Asp	Thr		
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 <212> PRT
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<400> 8

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Thr Ala Glu Tyr Val Glu Ile Lys Gly Pro Leu Asp Gln Glu Leu Phe
 35 40 45

Glu Lys Ala Leu Arg His Val Ile Lys Glu Ala Glu Ser Phe His Ala
 50 55 60

Arg Phe Gly Glu Asp Gln Asp Gly Pro Trp Gln Glu Ile Val Pro Ser
 65 70 75 80

Thr Asp Phe Pro Leu His Tyr Ile Asp Val Ser Ser Glu Thr Asp Pro
 85 90 95

Glu Gln Ala Ala Lys Ser Trp Met Met Asp Asp Leu Ala Arg Pro Val
 100 105 110

Asp Leu Thr Arg Gly Pro Leu Phe Thr Glu Ala Leu Phe Lys Ala Ala
 115 120 125

Gln Asp His Tyr Phe Trp Tyr Gln Arg Thr His His Ile Ala Thr Asp
 130 135 140

Gly Phe Ser Phe Thr Leu Ile Ala Glu Arg Leu Ser Lys Ile Tyr Thr
 145 150 155 160

Ala Leu Met Gln Asn Lys Ser Ile Asp Gln Ser Gly Ala Phe Gly Ser
 165 170 175

Leu Asp Leu Ile Leu Ala Glu Glu Thr Ala Tyr Arg Ala Ser Glu Gln
 180 185 190

Tyr Gln Glu Asp Arg Arg Phe Trp Leu Gly Arg Phe Ser Asp Glu Pro
 195 200 205

Glu Val Val Ser Leu Ala Glu Arg Ala Pro Arg Thr Ser Ser Ser Phe
 210 215 220

Leu Arg Arg Ser Glu His Leu Pro Ser Glu Asp Ala Asp Arg Leu Leu
 225 230 235 240

Ser Ala Ala Ser Arg Met Gly Ala Thr Trp His Glu Thr Val Met Ala
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245

250

255

Ala Ala Ala Ile Tyr Val His Arg Leu Thr Gly Ala Asn Asp Val Val
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Leu Gly Met Pro Met Met Cys Arg Leu Gly Ser Ala Ala Leu His Ile
 275 280 285

Pro Gly Met Val Met Asn Leu Leu Pro Leu Arg Ile Gly Met Gln Pro
 290 295 300

Gln Met Ser Ile Gly Glu Leu Val Lys Gln Ile Ser Gly Glu Met Met
 305 310 315 320

Lys Leu Arg Arg His Gln His Tyr Arg His Glu Glu Leu Arg Arg Asp
 325 330 335

Leu Lys Leu Leu Gly Glu Asn Gln Arg Leu Phe Gly Pro Gln Leu Asn
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Leu Met Pro Phe Glu Asn Arg Leu Asn Phe Ala Gly Cys Gln Gly Ile
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Val His Asn Leu Ala Thr Gly Pro Val Asp Asp Leu Ser Ile Asn Ile
 370 375 380

Tyr Gly Arg Pro Asp Gly Gly Gly Leu Lys Val Asn Met Asp Ala Asn
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Pro Ala Val Tyr His Ala Asp Glu Leu Glu Asp His Gly Asn Arg Phe
 405 410 415

Leu Thr Leu Leu Lys Thr Ile Ala Val Cys Glu Gln Thr Gln Pro Val
 420 425 430

Gly Thr Leu Asp Ile Leu Leu Pro Glu Glu Arg Ala Gln Ile Leu Ile
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Glu Trp Asn Gln Thr Glu His Gly Leu Pro Lys Glu Ser Leu Pro Gln
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Arg Phe Glu Arg Met Ala Lys Glu Cys Pro Glu Ser Pro Ala Val Val
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Cys Asn Asp Lys Val Leu Thr Tyr Ser Glu Leu Asn Gln Lys Ala Asn
 485 490 495

Gln Leu Ala His Leu Leu Ile Asp Gln Gly Ala Lys Pro Glu Thr Phe
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515

520

525

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Val Met Thr Ser Lys Glu Ala Gln Asp Thr Ile Gly Ser Gln Met Pro
 565 570 575

Lys Leu Ile Leu Asp Glu Gln Thr Val Met Glu Lys Met Ser Gly Cys
 580 585 590

Ser Glu Glu Asn Pro Gly Glu Gln His Ser Gly Asn Gln Pro Ala Tyr
 595 600 605

Met Ile Tyr Thr Ser Gly Ser Thr Gly Arg Pro Lys Gly Val Val Val
 610 615 620

Gln Ala Glu Ser Leu Phe Asn Phe Leu Leu Ser Met Gln Asp Met Phe
 625 630 635 640

Ala Leu Asn Gln Asp Asp Arg Leu Leu Ala Val Thr Thr Ile Ala Phe
 645 650 655

Asp Ile Ser Ala Leu Glu Ile Tyr Leu Pro Leu Ile Ser Gly Ser Ala
 660 665 670

Val Val Leu Ala Glu Lys Glu Thr Val Gln Asp Pro Ser Glu Leu Ala
 675 680 685

Lys Met Ile Glu Thr Tyr Glu Ile Thr Ile Met Gln Ala Thr Pro Thr
 690 695 700

Leu Trp His Ala Leu Ala Ser Ser Ala Pro Glu Lys Leu Lys Gly Leu
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Arg Ala Leu Val Gly Gly Glu Ala Leu Gln Ser Ser Leu Ala Arg Gln
 725 730 735

Leu Gln Gln Leu Ala Cys Ser Leu Thr Asn Leu Tyr Gly Pro Thr Glu
 740 745 750

Thr Thr Ile Trp Ser Thr Ala Ala Ala Leu Glu Gly Asn Cys Thr Glu
 755 760 765

Pro Pro Gly Ile Gly Cys Ala Ile Trp Asn Thr Gln Leu Tyr Val Leu
 770 775 780

Asp Ala Gly Leu Gln Pro Val Pro Pro Gly Thr Ala Gly Glu Leu Tyr
 Page 23

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Glu	Leu	Arg	Arg	Phe	Val	Gly	Glu	Thr	Leu	Pro	Asp	Tyr	Met	Ile	Pro		
		915					920					925					
Ser	Ala	Phe	Val	Ile	Leu	Asp	Glu	Leu	Pro	Leu	Thr	Pro	Asn	Gly	Lys		
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Leu	Asp	Arg	Lys	Ser	Leu	Pro	Ala	Pro	Ala	Val	Ser	Met	His	Thr	Gly		
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Gly	Arg	Glu	Pro	Arg	Thr	Pro	Gln	Glu	Glu	Ile	Leu	Cys	Asp	Leu	Phe		
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Ala	Glu	Val	Leu	Gly	Val	Pro	Arg	Val	Ser	Ile	Asp	Asp	Ser	Phe	Phe		
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Asp	Leu	Gly	Gly	His	Ser	Leu	Leu	Ala	Gly	Arg	Leu	Val	Gly	Arg	Ile		
		995					1000					1005					
Arg	Glu	Met	Leu	Gly	Val	Glu	Leu	Gly	Ile	Gly	Arg	Leu	Phe	Asp			
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Glu	Pro	Thr	Ala	Ala	Gly	Leu	Ala	Lys	Gln	Leu	Asp	Gln	Ala	Gln			
	1025					1030					1035						
Ser	Ala	Arg	Pro	Ala	Leu	Arg	Lys	Arg	Glu	Arg	Arg	Lys	Glu	Ile			
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Pro	Leu	Ser	Phe	Ala	Gln	Arg	Arg	Leu	Trp	Phe	Le						

1055 1060 10297.204.ST25.txt 1065

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Thr Gly Asp Leu Asp Gln Lys Ala Leu Ala Ala Ala Leu Gly Asp
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Val Ala Thr Arg His Glu Pro Leu Arg Thr Ile Phe Pro Asp Gln
1100 1105 1110

Gln Gly Thr Thr His Gln Leu Ile Leu Glu Glu Asp Gln Ser Arg
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Pro Glu Leu Thr Val Ser His Val Ser Glu His Glu Leu Glu Lys
1130 1135 1140

Val Leu Ala Glu Ala Val Arg His Arg Tyr His Leu Glu Lys Glu
1145 1150 1155

Pro Pro Phe Arg Ala Gln Leu Phe Val Leu Gly Pro Asp Lys Phe
1160 1165 1170

Val Leu Leu Leu Leu Leu His His Met Ile Gly Asp Gly Trp Ser
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Ala Asp Tyr Ala Val Trp Gln Glu Tyr Leu Leu Gly Ser Glu Asn
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Asn Pro Asp Ser Leu Ile Ala Lys Gln Leu Glu Tyr Trp Ser Lys
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Pro Arg Pro Ser Glu Ser Ser Tyr Arg Ser Gly Thr Ile Asp Leu
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Ser Ile Asp Glu Gln Leu His Gly Arg Leu Phe Asp Leu Ser Arg
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Ser Thr Gly Val Ser Met Phe Met Ile Leu Gln Ser Ala Leu Ala
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10297.204.ST25.txt

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 1355 1360 1365
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 1370 1375 1380
 Glu Val Leu Asn Pro Arg Arg Ser Arg Ala Arg His Pro Leu Phe
 1385 1390 1395
 Gln Ile Met Leu Ala Phe Gln Asn Thr Pro Glu Pro Glu Leu Asp
 1400 1405 1410
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 1415 1420 1425
 Ala Lys Phe Asp Leu Thr Ile Glu Leu Arg Glu His Arg Lys Ala
 1430 1435 1440
 Asp Gly Thr Pro Ala Gly Ile Gly Gly Phe Leu Glu Tyr Ser Thr
 1445 1450 1455
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 Val Arg Leu Leu Asp Ser Ala Ala Asp Asp Pro Asp Gln Pro Ile
 1475 1480 1485
 Glu Lys Leu Asp Ile Leu Leu Pro Ala Glu Arg Glu Asn Met Leu
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 Pro Val Leu Phe Glu Lys Gln Ala Ala Lys Asp Pro Glu Ala Val
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 Lys Arg Ala Asn Arg Leu Ala His Leu Leu Ile Ala Lys Gly Val
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 Gly Pro Glu Gln Phe Ala Ala Leu Ala Leu Pro Arg Ser Leu Asp

10297.204.ST25.txt

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 Leu Asn Asp Ala His Pro Val Cys Ile Val Thr Ser Ser Ala Val
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 Glu Ser Asn Leu Ser Val Pro Gly Ser Val Glu Arg Ile Val Leu
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 Asp Asp Pro Cys Ile Gln Glu Glu Leu Lys Gly Cys Ala Ala Ala
 1640 1645 1650
 Asn Pro Cys Asp Ala Asp Arg Thr Ala Pro Leu Leu Pro Leu His
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 Pro Ala Tyr Val Ile Tyr Thr Ser Gly Ser Thr Gly Lys Pro Lys
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 Thr Asp Gln Trp Phe His Phe Gly Ala Asp Asp Val Trp Thr Met
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 Phe His Ser Tyr Ala Phe Asp Phe Ser Val Trp Glu Ile Trp Gly
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 Ala Leu Leu Asn Gly Gly Arg Leu Ile Val Val Pro His Thr Ile
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 Val Thr Val Leu Asn Gln Thr Pro Ser Ala Phe Tyr Gln Leu Met
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 Gln Ala Asp Arg Asp Asn Ala Glu Thr Gly Lys Leu Leu Ser Leu
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 Arg Phe Ile Ile Phe Gly Gly Glu Ala Leu Glu Leu Lys Arg Leu
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 1805 1810 1815
 Asn Met Tyr Gly Ile Thr Glu Thr Thr Val His Val Ser Tyr Ile

10297.204.ST25.txt

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 1850 1855 1860
 Leu Glu Pro Val Pro Pro Gly Val Thr Gly Glu Met Tyr Val Ser
 1865 1870 1875
 Gly Gly Gly Leu Ala Arg Gly Tyr Leu Gly Arg Pro Asp Leu Thr
 1880 1885 1890
 Ala Asp Arg Phe Val Ala Asp Pro Phe Gly Pro Pro Gly Thr Arg
 1895 1900 1905
 Met Tyr Arg Thr Gly Asp Leu Ala Arg Arg Arg Gln Asp Gly Ser
 1910 1915 1920
 Leu Asp Tyr Met Gly Arg Ala Asp Gln Gln Ile Lys Ile Arg Gly
 1925 1930 1935
 Phe Arg Ile Glu Leu Gly Glu Ile Glu Ala Val Leu Val Arg His
 1940 1945 1950
 His Arg Val Asn Gln Ala Ala Val Val Val Arg Glu Gly Gln Pro
 1955 1960 1965
 Gly Asp Lys Arg Leu Ile Ala Tyr Val Val Pro Ala Ser Glu Glu
 1970 1975 1980
 Glu Thr Asp Pro Ala Glu Leu Arg Arg Phe Ala Ala Gly Thr Leu
 1985 1990 1995
 Pro Glu Tyr Met Val Pro Ser Ala Phe Val Lys Ile Ser Glu Leu
 2000 2005 2010
 Pro Leu Thr Pro Asn Gly Lys Leu Asp Arg Lys Ala Leu Pro Glu
 2015 2020 2025
 Pro Asp Phe Ala Ala Ala Val Lys Gly Arg Gly Pro Arg Thr Pro
 2030 2035 2040
 Gln Glu Glu Ile Leu Cys Asp Leu Phe Ser Glu Ile Leu Asn Ala
 2045 2050 2055
 Pro Arg Val Gly Ile Asp Asp Gly Phe Phe Glu Leu Gly Gly His
 2060 2065 2070
 Ser Leu Leu Ala Val Gln Leu Met Ser Arg Ile Arg Glu Ala Leu

10297.204.ST25.txt
2085

2075 2080

Gly Val Glu Leu Gly Ile Gly Asp Leu Leu Glu Ala Pro Thr Val
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Ser Gly Leu Ala Glu Arg Leu Glu Ser Gly Gly Arg Gln Ser Ala
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Leu Phe Cys Val His Pro Ala Gly Gly Leu Ser Trp Cys Tyr Ala
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Gly Leu Met Thr Ala Leu Gly Lys Glu Tyr Pro Ile Tyr Gly Leu
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Gln Ala Arg Gly Ile Ala Arg Gln Glu Glu Leu Pro Asp Thr Leu
2165 2170 2175

Asp Asp Met Ala Ala Asp Tyr Ile Arg His Ile Arg Thr Ile Gln
2180 2185 2190

Pro Thr Gly Pro Tyr Arg Leu Leu Gly Trp Ser Leu Gly Gly Asn
2195 2200 2205

Val Val His Ala Ile Ala Thr Gln Leu Gln Glu Gln Gly Glu Asp
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Ile Ser Leu Leu Val Met Leu Asp Ala Tyr Pro Asn His Phe Leu
2225 2230 2235

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2240 2245 2250

Leu Ala Leu Gly Gly Tyr Asp Pro Asp Ser Leu Asp Gly Ala Pro
2255 2260 2265

Leu Asn Leu Ser Ser Ala Ile Asp Ile Leu Arg Arg Asp Gly Ser
2270 2275 2280

Ala Leu Ala Ser Leu Asp Glu Ala Ala Ile Leu Asn Leu Lys Glu
2285 2290 2295

Thr Tyr Val Asn Ser Val Arg Ile Leu Ser Glu Tyr Lys Pro Arg
2300 2305 2310

Val Phe His Gly Asp Ile Leu Phe Phe Lys Ser Thr Val Ile Pro
2315 2320 2325

Glu Trp Phe Asp Pro Ile Asp Pro Glu Ser Trp Leu Pro Tyr Leu

2335

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10297.204.ST25.txt

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Ile Asp His His His Leu Glu Arg Leu His Asp Val Ser Asp Gln Glu	
140 145 150 155	
ctt ctt gaa gcc gcc gat cag ctg cgc act tta atg gga gaa aat att	833
Leu Leu Glu Ala Ala Asp Gln Leu Arg Thr Leu Met Gly Glu Asn Ile	
160 165 170	
ttt gaa ttg att ttt ctg cct gcg ctt gac gaa aaa acc ttg ccg ctg	881
Phe Glu Leu Ile Phe Leu Pro Ala Leu Asp Glu Lys Thr Leu Pro Leu	
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Lys Pro Glu Val Ala Val Ala Lys Gly Ala Ala Lys Glu Ile Asn Leu	
190 195 200	
tta atc gga acc aaa ccc gtg atg aag gcg tct gtt ttt tcc tct gat	977
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 35 40 45

Ser Ile Asp Asp Ser Tyr Ser Ser Asn Leu Gly Leu Leu Asp Gln Ile
 50 55 60

Ala Ala Leu Glu Trp Val Lys Asp Asn Ile Ala Phe Phe Gly Gly Asp
 65 70 75 80

Arg His His Ile Thr Val Phe Gly Glu Ser Ala Gly Ser Met Ser Ile
 85 90 95

Ala Ser Leu Leu Ala Met Pro Lys Ala Lys Gly Leu Phe Gln Gln Ala
 100 105 110

Ile Met Glu Ser Gly Ala Ser Ala Thr Met Ser Asp Lys Leu Ala Lys
 115 120 125

10297.204.ST25.txt															
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Lys	Ile	Ile	Asn	Ser	Ser	Lys	Ala	Glu	Leu	Leu	Leu	Asn	Asn	Ser	Gly
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Thr	Ser	Val	Asp	Thr	Gly	Asp	Ala	Leu	Ile	Ser	Val	Val	Glu	Pro	Gly
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His	Gly	Glu	Asp	Thr	Phe	Tyr	Ile	Ile	Tyr	Thr	Ser	Gly	Ser	Thr	Gly
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Asp	Trp	Ile	Thr	Asn	Asp	Phe	Pro	Val	Glu	Ser	Gly	Gln	Val	Phe	Leu
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aat	caa	gcc	ccg	ttt	tcc	ttt	gat	tta	tcg	gta	atg	gac	ctt	tat	ccg
Asn	Gln	Ala	Pro	Phe	Ser	Phe	Asp	Leu	Ser	Val	Met	Asp	Leu	Tyr	Pro
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Cys	Leu	Gln	Ser	Gly	Gly	Thr	Leu	Trp	Thr	Val	Thr	Lys	Asp	Met	Ile
	205					210					215				
aat	cgg	ccg	aaa	cta	ttg	ttt	gaa	gca	ctg	aaa	cag	tcc	aac	gtc	aac
Asn	Arg	Pro	Lys	Leu	Leu	Phe	Glu	Ala	Leu	Lys	Gln	Ser	Asn	Val	Asn
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gtc	tgg	aca	tcg	acg	cct	tca	ttc	gca	caa	atg	tgc	ttg	atg	gat	ccg
Val	Trp	Thr	Ser	Thr	Pro	Ser	Phe	Ala	Gln	Met	Cys	Leu	Met	Asp	Pro
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tct	tat	tcg	gaa	gag	ctg	ctt	ccg	gag	ctg	agc	ttg	ttt	atg	ttc	tgc
Ser	Tyr	Ser	Glu	Glu	Leu	Leu	Pro	Glu	Leu	Ser	Leu	Phe	Met	Phe	Cys
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Gly	Glu	Thr	Leu	Pro	Ala	Ser	Val	Ala	Arg	Gln	Leu	Lys	Glu	Arg	Phe
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cca	aag	gct	cgt	gtt	ttt	aac	aca	tac	ggc	ccg	acc	gaa	gcg	acc	gtt
Pro	Lys	Ala	Arg	Val	Phe	Asn	Thr	Tyr	Gly	Pro	Thr	Glu	Ala	Thr	Val
	285					290					295				
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Ala	Val	Thr	Ser	Ile	Glu	Val	Thr	Asp	Asp	Val	Leu	Asn	Lys	Tyr	Ser
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10297.204.ST25.txt

Ser Leu Pro Val Gly Ser Glu Lys Pro Glu Thr Glu Ile Val Ile Ile
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 Asn Glu Asp Gly Lys Ala Val Gln Asp Gly Glu Lys Gly Glu Ile Ile
 335 340 345

att acc gga gca agc gtc agc aaa ggc tat tta ggc gaa aaa gcg ctg 1589
 Ile Thr Gly Ala Ser Val Ser Lys Gly Tyr Leu Gly Glu Lys Ala Leu
 350 355 360

acg gaa aaa gcg ttt ttc tct tac aac ggc tcc cct gct tac cgc acc 1637
 Thr Glu Lys Ala Phe Phe Ser Tyr Asn Gly Ser Pro Ala Tyr Arg Thr
 365 370 375

ggc gaa gca ggt tac aaa gaa aac ggc cag ctc ttc ttc ctc gga aga 1685
 Gly Asp Ala Gly Tyr Lys Glu Asn Gly Gln Leu Phe Phe Leu Gly Arg
 380 385 390

ctc gat ttc caa atc aaa ctg cac ggc tac cgg att gag ctt gaa gaa 1733
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 400 405 410

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 Val Pro Ala Glu His Asp Phe Glu Lys Glu Tyr Gln Leu Thr Ser Ala
 445 450 455

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 460 465 470 475

aaa ttc atg tat caa aaa gag att ccg atg aca gca aac ggt aaa atc 1973
 Lys Phe Met Tyr Gln Lys Glu Ile Pro Met Thr Ala Asn Gly Lys Ile
 480 485 490

gac cgc aag aga tta aaa gaa gag gta acc gta tgacgcctta tgggtcattt 2026
 Asp Arg Lys Arg Leu Lys Glu Glu Val Thr Val
 495 500

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10297.204.ST25.txt

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 35 40 45

Thr Asp Ala Ser Pro Ile Ile Val Tyr Gly His Met Lys Pro Val Met
 50 55 60

Ala Val Ser Phe Leu Ala Cys Val Lys Ala Gly His Pro Tyr Ile Pro
 65 70 75 80

Val Asp Val Ser Ile Pro Ala Asp Arg Ile Leu Lys Ile Ile Asn Ser
 85 90 95

Ser Lys Ala Glu Leu Leu Leu Asn Asn Ser Gly Thr Ser Val Asp Thr
 100 105 110

Gly Asp Ala Leu Ile Ser Val Val Glu Pro Gly Val Leu Glu Gly Asp
 115 120 125

Gly Val Pro Glu Thr Asp Pro Gly Arg Trp Val His Gly Glu Asp Thr
 130 135 140

Phe Tyr Ile Ile Tyr Thr Ser Gly Ser Thr Gly Asn Pro Lys Gly Val
 145 150 155 160

Gln Ile Ser Ala Asp Asn Leu Gln Ser Phe Thr Asp Trp Ile Thr Asn
 165 170 175

Asp Phe Pro Val Glu Ser Gly Gln Val Phe Leu Asn Gln Ala Pro Phe
 180 185 190

Ser Phe Asp Leu Ser Val Met Asp Leu Tyr Pro Cys Leu Gln Ser Gly
 195 200 205

Gly Thr Leu Trp Thr Val Thr Lys Asp Met Ile Asn Arg Pro Lys Leu
 210 215 220

Leu Phe Glu Ala Leu Lys Gln Ser Asn Val Asn Val Trp Thr Ser Thr
 225 230 235 240

Pro Ser Phe Ala Gln Met Cys Leu Met Asp Pro Ser Tyr Ser Glu Glu
 245 250 255

Leu Leu Pro Glu Leu Ser Leu Phe Met Phe Cys Gly Glu Thr Leu Pro
 Page 35

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265

260

270

Ala Ser Val Ala Arg Gln Leu Lys Glu Arg Phe Pro Lys Ala Arg Val
 275 280 285

Phe Asn Thr Tyr Gly Pro Thr Glu Ala Thr Val Ala Val Thr Ser Ile
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Glu Val Thr Asp Asp Val Leu Asn Lys Tyr Ser Ser Leu Pro Val Gly
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Ser Glu Lys Pro Glu Thr Glu Ile Val Ile Ile Asn Glu Asp Gly Lys
 325 330 335

Ala Val Gln Asp Gly Glu Lys Gly Glu Ile Ile Ile Thr Gly Ala Ser
 340 345 350

Val Ser Lys Gly Tyr Leu Gly Glu Lys Ala Leu Thr Glu Lys Ala Phe
 355 360 365

Phe Ser Tyr Asn Gly Ser Pro Ala Tyr Arg Thr Gly Asp Ala Gly Tyr
 370 375 380

Lys Glu Asn Gly Gln Leu Phe Phe Leu Gly Arg Leu Asp Phe Gln Ile
 385 390 395 400

Lys Leu His Gly Tyr Arg Ile Glu Leu Glu Glu Ile Glu Tyr Gln Ile
 405 410 415

Asn Gln Ser Arg Tyr Val Gln Ser Ala Val Val Ile Pro Phe Tyr Arg
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Glu Glu Lys Ile Glu Tyr Leu Ile Ala Met Ile Val Pro Ala Glu His
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10297.204.ST25.txt

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Gln Arg Arg Ile Trp Tyr Thr Glu Lys Phe Tyr Pro Gly Thr Ser Val	
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Ser Asn Leu Ser Gly Phe Gly Lys Leu Lys Ser Ala Ser Gly Ile Asp	
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Ser Gly Leu Leu Thr Glu Ala Ile Arg Lys Phe Val Arg Thr Asn Asp	
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acg atg cga ttc agg ctg atg ttt gaa gga gag gat gag ccg aag cag	725
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Tyr Ile Ala Glu Asp Glu Pro Phe Gln Ile Glu Tyr Phe Asp Ala Ser	
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Glu Ser Gly Gly Ala Asp Gly Val Leu Lys Trp Gly Gln Ala Glu Ala	
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Arg Arg Pro Leu Pro Leu Tyr Asp Ser Pro Leu Phe Lys Phe Ala Val	
110 115 120	
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Val Arg Ile Ser Glu Glu Glu Ser Trp Phe Phe Ala Lys Val His His	
125 130 135	
atc att tcc gac ggc att tct atg acg atc cta ggc aac cgg att aca	965
Ile Ile Ser Asp Gly Ile Ser Met Thr Ile Leu Gly Asn Arg Ile Thr	
140 145 150 155	
gat att tat ttg aag ctt gcc aaa ggg gaa acc gac ctt gaa cct gta	1013
Asp Ile Tyr Leu Lys Leu Ala Lys Gly Glu Thr Asp Leu Glu Pro Val	
160 165 170	
cag tca tca ttt acg gaa cat atc cag agc gaa ttg gag tat gaa aat	1061
Gln Ser Ser Phe Thr Glu His Ile Gln Ser Glu Leu Glu Tyr Glu Asn	

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175										180										185										
tcg	aag	cgt	ttc	cag	aag	gat	aaa	gca	tat	tgg	aac	gca	caa	tat	gaa	1109														
Ser	Lys	Arg	Phe	Gln	Lys	Asp	Lys	Ala	Tyr	Trp	Asn	Ala	Gln	Tyr	Glu															
		190					195					200																		
gcg	att	ccg	gag	ccc	gta	tcg	tta	aaa	gcg	agc	gat	acg	tat	cag	atc	1157														
Ala	Ile	Pro	Glu	Pro	Val	Ser	Leu	Lys	Ala	Ser	Asp	Thr	Tyr	Gln	Ile															
	205					210					215																			
caa	ttg	gat	gca	gcc	cgc	ttt	tca	aaa	gag	att	tcc	cct	gac	ctg	tat	1205														
Gln	Leu	Asp	Ala	Ala	Arg	Phe	Ser	Lys	Glu	Ile	Ser	Pro	Asp	Leu	Tyr															
	220				225					230					235															
aaa	aaa	att	caa	acg	tat	tgt	aat	gaa	cac	aac	atc	agt	gta	ctc	tcc	1253														
Lys	Lys	Ile	Gln	Thr	Tyr	Cys	Asn	Glu	His	Asn	Ile	Ser	Val	Leu	Ser															
				240					245					250																
ctg	ttc	cta	tcc	att	ctg	cac	atc	tat	atg	cac	cgg	gta	acc	gga	caa	1301														
Leu	Phe	Leu	Ser	Ile	Leu	His	Ile	Tyr	Met	His	Arg	Val	Thr	Gly	Gln															
			255					260					265																	
aaa	gac	gtc	gtt	ctc	gga	aca	ttt	atg	ggc	aac	cgg	aca	aat	gca	aaa	1349														
Lys	Asp	Val	Val	Leu	Gly	Thr	Phe	Met	Gly	Asn	Arg	Thr	Asn	Ala	Lys															
		270					275					280																		
gaa	aaa	cag	atg	ctc	ggg	atg	ttt	gtg	tcg	acg	att	ccg	atg	aaa	gcc	1397														
Glu	Lys	Gln	Met	Leu	Gly	Met	Phe	Val	Ser	Thr	Ile	Pro	Met	Lys	Ala															
	285					290					295																			
tcc	att	gaa	gta	cac	caa	gac	ttt	agt	gca	ttt	gtg	cag	gaa	aga	atg	1445														
Ser	Ile	Glu	Val	His	Gln	Asp	Phe	Ser	Ala	Phe	Val	Gln	Glu	Arg	Met															
					305					310					315															
aag	gac	cag	ctg	aaa	atc	att	cgg	cat	caa	aag	tat	ccg	tac	aat	ctg	1493														
Lys	Asp	Gln	Leu	Lys	Ile	Ile	Arg	His	Gln	Lys	Tyr	Pro	Tyr	Asn	Leu															
				320					325					330																
ctg	att	aat	gat	ttg	cgg	gaa	aga	cag	ccg	cat	gtc	agc	aaa	ttg	ttc	1541														
Leu	Ile	Asn	Asp	Leu	Arg	Glu	Arg	Gln	Pro	His	Val	Ser	Lys	Leu	Phe															
			335					340					345																	
gcc	gtc	tca	ctg	gaa	tat	cag	gtt	atg	caa	tgg	cag	caa	aaa	gaa	acg	1589														
Ala	Val	Ser	Leu	Glu	Tyr	Gln	Val	Met	Gln	Trp	Gln	Gln	Lys	Glu	Thr															
		350					355					360																		
gtg	tcg	ttt	ctt	acc	gag	ccg	att	ttc	agc	ggc	agt	gaa	gta	aac	gat	1637														
Val	Ser	Phe	Leu	Thr	Glu	Pro	Ile	Phe	Ser	Gly	Ser	Glu	Val	Asn	Asp															
	365					370				375																				
att	tcc	att	cat	gtg	aaa	gag	aga	tgg	gat	acc	ggg	acg	ctt	gcg	att	1685														
Ile	Ser	Ile	His	Val	Lys	Glu	Arg	Trp	Asp	Thr	Gly	Thr	Leu	Ala	Ile															
					385					390					395															
gat	ttt	gat	tac	agg	gag	gag	ctt	ttt	act	tcg	gaa	gaa	atg	gcc	gtg	1733														
Asp	Phe	Asp	Tyr	Arg	Glu	Glu	Leu	Phe	Thr	Ser	Glu	Glu	Met	Ala	Val															
				400					405					410																
tta	tat	gaa	cgg	ctg	atg	acg	ctg	ctt	gaa	gat	gcc	ctg	ctg	tct	ccg	1781														
Leu	Tyr	Glu	Arg	Leu	Met	Thr	Leu	Leu	Glu	Asp	Ala	Leu	Leu	Ser	Pro															
			415				420						425																	
caa	aaa	aca	atc	gct	gaa	ctg	gag	att	gtt	ccc	gct	ttt	gaa	aaa	gag	1829														
Gln	Lys	Thr	Ile	Ala	Glu	Leu	Glu	Ile	Val	Pro	Ala	Phe	Glu	Lys	Glu															
		430					435					440																		
cgg	ctg	tta	aag	cgt	gca	tca	agc	caa	acc	att	gca	tat	gac	aag	aac	1877														
Arg	Leu	Leu	Lys	Arg	Ala	Ser	Ser	Gln	Thr	Ile	Ala	Tyr	Asp	Lys	Asn															

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445	450	455	
atg acc ctg cac ggt tta ttt gaa caa aaa gca gcc gat cat ccc gaa Met Thr Leu His Gly Leu Phe Glu Gln Lys Ala Ala Asp His Pro Glu 460 465 470 475			1925
aaa aca gcg gtt gta tat gaa gga caa aaa ctt tcg tac cgg gag ttg Lys Thr Ala Val Val Tyr Glu Gly Gln Lys Leu Ser Tyr Arg Glu Leu 480 485 490			1973
aat gaa caa tcg agc cgc ttg gca atg gcg ctt cgg aga aga ggc atc Asn Glu Gln Ser Ser Arg Leu Ala Met Ala Leu Arg Arg Arg Gly Ile 495 500 505			2021
ggg cct gat gct ccg gct gcg ata gtg atg gag cgg tca gag cgg gtc Gly Pro Asp Ala Pro Ala Ala Ile Val Met Glu Arg Ser Glu Arg Val 510 515 520			2069
atc acg gcg atg atg ggc gtt ttg aaa gcc ggc gga gct tat gta ccg Ile Thr Ala Met Met Gly Val Leu Lys Ala Gly Gly Ala Tyr Val Pro 525 530 535			2117
atc gat cct gga ttt ccg gaa gaa aga atc cgt ttt atg ctg gag gat Ile Asp Pro Gly Phe Pro Glu Glu Arg Ile Arg Phe Met Leu Glu Asp 540 545 550 555			2165
tca aag gcg aaa gcg gtt atc aca gac agc ggg ctg act ttt gaa acg Ser Lys Ala Lys Ala Val Ile Thr Asp Ser Gly Leu Thr Phe Glu Thr 560 565 570			2213
gct gaa acg gtg cag ttc agc gaa gcg ctt tct gaa tcg cgg gaa aac Ala Glu Thr Val Gln Phe Ser Glu Ala Leu Ser Glu Ser Arg Glu Asn 575 580 585			2261
ggc tat ccg tct tca gcg gca ggc gcc ggg cac ctt gca tac atc att Gly Tyr Pro Ser Ser Ala Ala Gly Ala Gly His Leu Ala Tyr Ile Ile 590 595 600			2309
tat act tcc ggt aca acg ggc cgt cca aaa ggc gtc atg att gaa cac Tyr Thr Ser Gly Thr Thr Gly Arg Pro Lys Gly Val Met Ile Glu His 605 610 615			2357
agg cag gtc cac cac ctt gtc aga gga ctt caa cag gcc gtt ggt aca Arg Gln Val His His Leu Val Arg Gly Leu Gln Ala Val Gly Thr 620 625 630 635			2405
tac gat cag gat gat ttg aaa ctg gcg ctt ctg gct cca ttt cat ttt Tyr Asp Gln Asp Asp Leu Lys Leu Ala Leu Leu Ala Pro Phe His Phe 640 645 650			2453
gat gct tcc gtt cag cag att ttt acg tct cta ttg ctc ggg caa acg Asp Ala Ser Val Gln Gln Ile Phe Thr Ser Leu Leu Leu Gly Gln Thr 655 660 665			2501
ttg tac atc gta ccg aaa aag acg gtt tcc gac gga cgc gct tta tcg Leu Tyr Ile Val Pro Lys Lys Thr Val Ser Asp Gly Arg Ala Leu Ser 670 675 680			2549
gat tat tac cgc cgg cat caa atc gat gtg aca gac ggt aca ccg gca Asp Tyr Tyr Arg Arg His Gln Ile Asp Val Thr Asp Gly Thr Pro Ala 685 690 695			2597
cat ttg cag ctt ttg gct gcg gct gat gat ctt tca ggc gtc aaa ttg His Leu Gln Leu Leu Ala Ala Ala Asp Asp Leu Ser Gly Val Lys Leu 700 705 710 715			2645
agg cat atg ctt gtt gga gga gag gct tta tca agg gtt gcg acg gaa Arg His Met Leu Val Gly Gly Glu Ala Leu Ser Arg Val Ala Thr Glu 720 725 730 735			2693

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720										725					730					
agg	ctg	ctt	cag	tta	ttt	gca	gaa	aca	gct	gaa	tcc	gtg	cct	gct	gtt	2741				
Arg	Leu	Leu	Gln	Leu	Phe	Ala	Glu	Thr	Ala	Glu	Ser	Val	Pro	Ala	Val					
			735					740					745							
acg	aat	gtt	tac	gga	ccg	acg	gaa	act	tgt	gtg	gat	gcc	tct	tct	ttt	2789				
Thr	Asn	Val	Tyr	Gly	Pro	Thr	Glu	Thr	Cys	Val	Asp	Ala	Ser	Ser	Phe					
		750					755					760								
acg	att	aca	aac	cgc	aca	gat	ctt	caa	tac	gat	acg	gcc	tat	gta	ccg	2837				
Thr	Ile	Thr	Asn	Arg	Thr	Asp	Leu	Gln	Tyr	Asp	Thr	Ala	Tyr	Val	Pro					
	765					770				775										
att	ggc	cgg	ccg	ata	gga	aat	aac	cgt	ttt	tat	att	ttg	gat	gaa	aac	2885				
Ile	Gly	Arg	Pro	Ile	Gly	Asn	Asn	Arg	Phe	Tyr	Ile	Leu	Asp	Glu	Asn					
780					785					790					795					
ggc	gca	ctc	ctt	cct	gat	ggc	gtc	gaa	ggg	gaa	ttg	tat	att	gca	gga	2933				
Gly	Ala	Leu	Leu	Pro	Asp	Gly	Val	Glu	Gly	Glu	Leu	Tyr	Ile	Ala	Gly					
				800					805					810						
gac	gga	gtc	ggg	cga	ggc	tat	ttg	aac	ttg	cct	gac	atg	acc	aga	gac	2981				
Asp	Gly	Val	Gly	Arg	Gly	Tyr	Leu	Asn	Leu	Pro	Asp	Met	Thr	Arg	Asp					
			815					820					825							
agg	ttc	ttg	aaa	gac	ccg	ttt	gta	tcc	gga	ggt	ctc	atg	tat	cga	aca	3029				
Arg	Phe	Leu	Lys	Asp	Pro	Phe	Val	Ser	Gly	Gly	Leu	Met	Tyr	Arg	Thr					
		830					835					840								
ggg	gat	act	gca	cgt	tgg	ctt	cct	gac	ggt	aca	gtt	gat	ttt	atc	ggc	3077				
Gly	Asp	Thr	Ala	Arg	Trp	Leu	Pro	Asp	Gly	Thr	Val	Asp	Phe	Ile	Gly					
	845					850					855									
cga	aga	gac	gat	caa	gtg	aaa	atc	cgc	ggc	ttc	cgg	atc	gag	ctt	ggc	3125				
Arg	Arg	Asp	Asp	Gln	Val	Lys	Ile	Arg	Gly	Phe	Arg	Ile	Glu	Leu	Gly					
860					865					870					875					
gag	ata	gag	tcg	gtg	ctg	caa	gga	gcc	cct	gct	gtc	gaa	aaa	gca	gtt	3173				
Glu	Ile	Glu	Ser	Val	Leu	Gln	Gly	Ala	Pro	Ala	Val	Glu	Lys	Ala	Val					
				880					885					890						
gtc	ctc	gcg	cgg	cat	gaa	acc	ggc	ggc	agc	ctt	gag	gtt	tgc	gct	tat	3221				
Val	Leu	Ala	Arg	His	Glu	Thr	Gly	Gly	Ser	Leu	Glu	Val	Cys	Ala	Tyr					
			895					900					905							
gtc	gtt	ccg	aaa	caa	ggc	gga	aag	att	cac	att	cag	gga	ctg	agg	gag	3269				
Val	Val	Pro	Lys	Gln	Gly	Gly	Lys	Ile	His	Ile	Gln	Gly	Leu	Arg	Glu					
		910					915					920								
cac	tta	tcc	aaa	cac	ctg	cct	gat	tat	atg	atc	cct	tcc	tgc	ttt	gtc	3317				
His	Leu	Ser	Lys	His	Leu	Pro	Asp	Tyr	Met	Ile	Pro	Ser	Cys	Phe	Val					
	925					930					935									
gag	ctt	aat	gaa	ata	ccg	ctg	acg	gca	agc	gga	aaa	gtc	gac	cgg	aaa	3365				
Glu	Leu	Asn	Glu	Ile	Pro	Leu	Thr	Ala	Ser	Gly	Lys	Val	Asp	Arg	Lys					
940					945					950					955					
gcg	ctg	ctt	cgc	cat	gag	gtg	tct	gtc	agc	ggg	act	gca	gaa	tat	gcg	3413				
Ala	Leu	Leu	Arg	His	Glu	Val	Ser	Val	Ser	Gly	Thr	Ala	Glu	Tyr	Ala					
				960					965					970						
gcg	ccg	aga	aat	gaa	tgt	gaa	gaa	aaa	atg	gtg	ggt	ata	tgg	cag	gaa	3461				
Ala	Pro	Arg	Asn	Glu	Cys	Glu	Glu	Lys	Met	Val	Gly	Ile	Trp	Gln	Glu					
			975					980					985							
gtg	ctc	gga	gct	gaa	caa	gtc	gga	atc	cac	gac	cag	ttt	ttt	gat	ctg	3509				
Val	Leu	Gly	Ala	Glu	Gln	Val	Gly	Ile	His	Asp	Gln	Phe	Phe	Asp	Leu					

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990					995					1000					
ggc Gly	ggc Gly 1005	cac His	tct Ser	ctc Leu	aaa Lys	gcg Ala 1010	atg Met	acc Thr	atg Met	ctg Leu	gca Ala 1015	aaa Lys	att Ile	cat His	3554
aaa Lys	gct Ala 1020	ttc Phe	gga Gly	gtc Val	gaa Glu 1025	gtt Val 1025	ccg Pro	ttg Leu	caa Gln	gtc Val	cta Leu 1030	ttt Phe	gaa Glu	aag Lys	3599
ccg Pro	aca Thr 1035	gta Val	gcg Ala	gcg Ala	ctg Leu	agc Ser 1040	ggc Gly	ttt Phe	gtt Val	tct Ser	gaa Glu 1045	gcc Ala	gag Glu	aaa Lys	3644
gac Asp	gga Gly 1050	ttc Phe	gcg Ala	gta Val	att Ile	gaa Glu 1055	ccg Pro	gcg Ala	ccg Pro	gaa Glu	agt Ser 1060	gac Asp	gat Asp	tat Tyr	3689
cct Pro	ctt Leu 1065	tca Ser	ttg Leu	gcg Ala	cag Gln	cag Gln 1070	cga Arg	atc Ile	tat Tyr	atc Ile	gtc Val 1075	agc Ser	cag Gln	ctg Leu	3734
gag Glu	ggt Gly 1080	gtc Val	ggc Gly	tac Tyr	aat Asn	atg Met 1085	ccg Pro	gcc Ala	gcg Ala	gcg Ala	atg Met 1090	ctt Leu	gaa Glu	ggc Gly	3779
act Thr	ctt Leu 1095	gac Asp	tct Ser	ggg Gly	cgc Arg	ctt Leu 1100	gaa Glu	gct Ala	gct Ala	ttt Phe	caa Gln 1105	aaa Lys	ctg Leu	att Ile	3824
gat Asp	agg Arg 1110	cat His	gag Glu	gcg Ala	ctg Leu	cgt Arg 1115	act Thr	tcg Ser	ttt Phe	aca Thr	gtt Val 1120	gtg Val	gat Asp	ggc Gly	3869
gag Glu	ccg Pro 1125	agg Arg	cag Gln	acc Thr	gtt Val	cat His 1130	caa Gln	agg Arg	gtt Val	cag Gln	ttc Phe 1135	aag Lys	att Ile	gag Glu	3914
aag Lys	gtt Val 1140	aag Lys	gcg Ala	gaa Glu	ggc Gly	aag Lys 1145	ccg Pro	atc Ile	gaa Glu	caa Gln	atc Ile 1150	gcg Ala	aaa Lys	tca Ser	3959
ttt Phe	gtc Val 1155	cgc Arg	cgc Arg	ttt Phe	gat Asp	ctc Leu 1160	gcc Ala	aaa Lys	gct Ala	ccg Pro	ctg Leu 1165	atg Met	aga Arg	gcg Ala	4004
ggt Gly	ctc Leu 1170	gtc Val	agc Ser	ctt Leu	gca Ala	gac Asp 1175	ggc Gly	aga Arg	cat His	ctg Leu	ctg Leu 1180	ttg Leu	ttc Phe	gat Asp	4049
atg Met	cat His 1185	cat His	ctc Leu	gta Val	tct Ser	gac Asp 1190	ggc Gly	gtg Val	tcg Ser	att Ile	tcg Ser 1195	atc Ile	ata Ile	ttg Leu	4094
aat Asn	gaa Glu 1200	ctg Leu	gcc Ala	gcg Ala	ctg Leu	tat Tyr 1205	aac Asn	ggg Gly	gag Glu	gaa Glu	ttg Leu 1210	ccg Pro	gag Glu	ctg Leu	4139
cgt Arg	ttg Leu 1215	cat His	tac Tyr	aaa Lys	gat Asp	tat Tyr 1220	gcc Ala	ttc Phe	tgg Trp	caa Gln	agg Arg 1225	gcg Ala	cag Gln	gca Ala	4184
caa Gln	gaa Glu 1230	ggc Gly	ttt Phe	caa Gln	aaa Lys	gaa Glu 1235	gag Glu	gcc Ala	tat Tyr	tgg Trp	gaa Glu 1240	agc Ser	atg Met	ttt Phe	4229
gcc Ala	ggc Gly	gag Glu	ctt Leu	ccc Pro	gta Val	ctg Leu	cag Gln	ctg Leu	atg Met	acg Thr	gac Asp	gag Glu	ccg Pro	agg Arg	4274

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1245						1250		1255							
ccg	cct	ggt	caa	agc	ttt	gaa	gga	gac	agg	gta	tcc	gca	gtc	ctg	4319
Pro	Pro	Val	Gln	Ser	Phe	Glu	Gly	Asp	Arg	Val	Ser	Ala	Val	Leu	
1260						1265		1270							
cca	aaa	gac	ctg	aaa	gaa	aaa	tta	gcc	gtg	ctg	gca	gag	caa	aac	4364
Pro	Lys	Asp	Leu	Lys	Glu	Lys	Leu	Ala	Val	Leu	Ala	Glu	Gln	Asn	
1275						1280		1285							
ggc	gcg	aca	ttg	tac	atg	gtc	atg	ctg	tct	gcg	tac	aac	atg	ctt	4409
Gly	Ala	Thr	Leu	Tyr	Met	Val	Met	Leu	Ser	Ala	Tyr	Asn	Met	Leu	
1290						1295		1300							
ctt	gca	aag	tac	tcc	ggg	cag	gaa	gat	gtg	atc	gtc	ggg	acg	ccg	4454
Leu	Ala	Lys	Tyr	Ser	Gly	Gln	Glu	Asp	Val	Ile	Val	Gly	Thr	Pro	
1305						1310		1315							
gcg	gcc	ggc	cgc	aga	cat	tcc	gat	ctg	gaa	gga	atc	atc	ggc	atg	4499
Ala	Ala	Gly	Arg	Arg	His	Ser	Asp	Leu	Glu	Gly	Ile	Ile	Gly	Met	
1320						1325		1330							
ttt	gtc	aat	acg	ctg	gcg	atc	cggt	tca	aaa	gtg	gac	ccg	ggc	aga	4544
Phe	Val	Asn	Thr	Leu	Ala	Ile	Arg	Ser	Lys	Val	Asp	Pro	Gly	Arg	
1335						1340		1345							
acg	ttc	gca	gac	ttc	ctg	aat	gat	gta	aag	aaa	acg	gta	atc	gat	4589
Thr	Phe	Ala	Asp	Phe	Leu	Asn	Asp	Val	Lys	Lys	Thr	Val	Ile	Asp	
1350						1355		1360							
gct	ttt	gag	cat	cag	gat	tat	ccg	ttt	gag	cggt	ctt	gcg	gag	aag	4634
Ala	Phe	Glu	His	Gln	Asp	Tyr	Pro	Phe	Glu	Arg	Leu	Ala	Glu	Lys	
1365						1370		1375							
ttt	ggc	gca	tcg	cggt	gat	tta	agc	cggt	cat	ccc	atc	ttt	gac	acg	4679
Phe	Gly	Ala	Ser	Arg	Asp	Leu	Ser	Arg	His	Pro	Ile	Phe	Asp	Thr	
1380						1385		1390							
atg	ttt	att	ttg	cag	aat	gca	tgg	gaa	gac	att	ccg	ctg	ctc	ggc	4724
Met	Phe	Ile	Leu	Gln	Asn	Ala	Trp	Glu	Asp	Ile	Pro	Leu	Leu	Gly	
1395						1400		1405							
gat	ttg	cac	ctc	tcg	att	tat	gaa	acg	aac	ttc	aat	att	gca	aaa	4769
Asp	Leu	His	Leu	Ser	Ile	Tyr	Glu	Thr	Asn	Phe	Asn	Ile	Ala	Lys	
1410						1415		1420							
ttc	gac	ttg	acg	ctg	cag	gca	aaa	gaa	gag	cag	gga	gaa	ttg	ata	4814
Phe	Asp	Leu	Thr	Leu	Gln	Ala	Lys	Glu	Glu	Gln	Gly	Glu	Leu	Ile	
1425						1430		1435							
ctc	gat	ttg	gat	tac	agc	acg	aag	ctg	ttt	aaa	aaa	gat	acg	gct	4859
Leu	Asp	Leu	Asp	Tyr	Ser	Thr	Lys	Leu	Phe	Lys	Lys	Asp	Thr	Ala	
1440						1445		1450							
gaa	agg	atg	ctg	aaa	gca	tac	ttg	aac	ctt	ctg	gag	gac	atg	gcg	4904
Glu	Arg	Met	Leu	Lys	Ala	Tyr	Leu	Asn	Leu	Leu	Glu	Asp	Met	Ala	
1455						1460		1465							
gct	gat	ccg	atg	ctc	agg	atc	ggc	gag	tac	agc	ctt	ttg	aca	gaa	4949
Ala	Asp	Pro	Met	Leu	Arg	Ile	Gly	Glu	Tyr	Ser	Leu	Leu	Thr	Glu	
1470						1475		1480							
gaa	gaa	acg	aat	cggt	cag	ctc	gtc	gcg	ttc	aac	ccc	gcg	aca	agc	4994
Glu	Glu	Thr	Asn	Arg	Gln	Leu	Val	Ala	Phe	Asn	Pro	Ala	Thr	Ser	
1485						1490		1495							
gat	tat	ccg	cggt	gag	aaa	acg	atc	gtt	cag	cta	ttc	gag	gaa	cag	5039
Asp	Tyr	Pro	Arg	Glu	Lys	Thr	Ile	Val	Gln	Leu	Phe	Glu	Glu	Gln	

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1500	1505	1510	
gct gca gaa aga ggc ggt tat Ala Ala Glu Arg Gly Gly Tyr 1515 1520	ccc gcc ctg caa ttt Pro Ala Leu Gln Phe 1525	gaa gac aaa Glu Asp Lys	5084
gta tgg tca tat gat gag ctc Val Trp Ser Tyr Asp Glu Leu 1530 1535	aat cgg aaa gcg aac Asn Arg Lys Ala Asn 1540	caa ttg gca Gln Leu Ala	5129
agg cgc ctc cgc gaa agt ggc Arg Arg Leu Arg Glu Ser Gly 1545 1550	gtg caa gcc ggc acg Val Gln Ala Gly Thr 1555	acg gcg gcc Thr Ala Ala	5174
att ctt acg gcc agg tcg gct Ile Leu Thr Ala Arg Ser Ala 1560 1565	gaa atg gtc atc ggc Glu Met Val Ile Gly 1570	att ctc gct Ile Leu Ala	5219
gtg ctg aaa gcc ggc ggg gct Val Leu Lys Ala Gly Gly Ala 1575 1580	tat gtg ccg atc gat Tyr Val Pro Ile Asp 1585	ccc gat cat Pro Asp His	5264
ccg gaa aag cgt gtg caa cat Pro Glu Lys Arg Val Gln His 1590 1595	ttc ttc aag gac agc Phe Phe Lys Asp Ser 1600	gga gcg gcg Gly Ala Ala	5309
gtt ctt tta acg caa aag gcg Val Leu Leu Thr Gln Lys Ala 1605 1610	atg aag ccg ctc gct Met Lys Pro Leu Ala 1615	gag gcg gcg Glu Ala Ala	5354
gaa ttt ggc ggc gac atc cta Glu Phe Gly Gly Asp Ile Leu 1620 1625	ttt gtt gag gat gaa Phe Val Glu Asp Glu 1630	aac ctt tat Asn Leu Tyr	5399
atg gga gat gcg tct gat ttg Met Gly Asp Ala Ser Asp Leu 1635 1640	cgc ctt ccg att tct Arg Leu Pro Ile Ser 1645	ccg gaa gca Pro Glu Ala	5444
atg gca aat cta acg tac aca Met Ala Asn Leu Thr Tyr Thr 1650 1655	tct gga acg aca ggg Ser Gly Thr Thr Gly 1660	acg ccg aag Thr Pro Lys	5489
ggc aat atg gtc tct cac cgg Gly Asn Met Val Ser His Arg 1665 1670	aat att ttg cgt act Asn Ile Leu Arg Thr 1675	gta aaa aac Val Lys Asn	5534
gcg aat tac ttg gaa gtg atg Ala Asn Tyr Leu Glu Val Met 1680 1685	gaa tcc gat atc gtt Glu Ser Asp Ile Val 1690	ctt tcg att Leu Ser Ile	5579
tca aat tat gtg ttc gac gcc Ser Asn Tyr Val Phe Asp Ala 1695 1700	ttt atg ttt gat gtg Phe Met Phe Asp Val 1705	ttc ggt tca Phe Gly Ser	5624
ttg ctg aac ggc gcc aag ctg Leu Leu Asn Gly Ala Lys Leu 1710 1715	gtg ata gct cca aaa Val Ile Ala Pro Lys 1720	gac acg att Asp Thr Ile	5669
ctt gat atg agc cgg ctc gca Leu Asp Met Ser Arg Leu Ala 1725 1730	cat gta ctc gaa aaa His Val Leu Glu Lys 1735	gaa aag att Glu Lys Ile	5714
acg att tta atg atc acg acc Thr Ile Leu Met Ile Thr Thr 1740 1745	gca tta ttc aat ctg Ala Leu Phe Asn Leu 1750	ctg aca gac Leu Thr Asp	5759
atg cgg ccg gac agt ttg aag Met Arg Pro Asp Ser Leu Lys	gga ctc cgc agg gtt Gly Leu Arg Arg Val	ctg ttc ggc Leu Phe Gly	5804

10297.204.ST25.txt															
1755							1760							1765	
ggc Gly	gaa Glu	cgt Arg	gca Ala	tct Ser	gtc Val	gat Asp	cat His	gtc Val	aga Arg	aga Arg	gcc Ala	ctg Leu	aag Lys	aca Thr	5849
1770	1775	1780													
ggt Val	ggc Gly	aga Arg	ggg Gly	cgg Arg	ctg Leu	ctt Leu	cat His	atg Met	tac Tyr	ggt Gly	ccg Pro	tct Ser	gag Glu	agc Ser	5894
1785	1790										1795				
acg Thr	gtc Val	ttt Phe	aca Thr	acc Thr	tac Tyr	cat His	cca Pro	gtc Val	aat Asn	gaa Glu	gtg Val	ccg Pro	gac Asp	gat Asp	5939
1800	1805										1810				
gcg Ala	cag Gln	gct Ala	ata Ile	ccg Pro	atc Ile	gga Gly	aag Lys	cct Pro	gtc Val	agc Ser	aat Asn	acg Thr	gag Glu	gtt Val	5984
1815	1820										1825				
ctg Leu	att Ile	ctt Leu	gat Asp	tca Ser	ttc Phe	ggc Gly	aat Asn	gta Val	cag Gln	ccg Pro	gca Ala	ggg Gly	gtt Val	gcg Ala	6029
1830	1835										1840				
gga Gly	gaa Glu	tta Leu	tgc Cys	gtc Val	ggc Gly	gga Gly	gac Asp	ggc Gly	ctt Leu	gtc Val	cgc Arg	ggc Gly	tat Tyr	ttt Phe	6074
1845	1850										1855				
aac Asn	cgc Arg	cct Pro	gaa Glu	ctg Leu	acg Thr	gct Ala	gaa Glu	aag Lys	ttt Phe	acg Thr	gcg Ala	cat His	ccg Pro	ttc Phe	6119
1860	1865										1870				
aaa Lys	acc Thr	ggc Gly	gaa Glu	aag Lys	att Ile	tac Tyr	cgg Arg	acg Thr	ggt Gly	gat Asp	atg Met	gcg Ala	aga Arg	tgg Trp	6164
1875	1880										1885				
ctt Leu	gcc Ala	gac Asp	gga Gly	tgc Cys	ctc Leu	gaa Glu	ttt Phe	atc Ile	ggt Gly	cgg Arg	att Ile	gat Asp	cat His	cag Gln	6209
1890	1895										1900				
gtc Val	aaa Lys	att Ile	cgc Arg	gga Gly	cag Gln	aga Arg	atc Ile	gag Glu	ctg Leu	ggc Gly	gaa Glu	atc Ile	gag Glu	cat His	6254
1905	1910										1915				
cat His	ctc Leu	cta Leu	acg Thr	cat His	gac Asp	atg Met	gtt Val	cag Gln	gaa Glu	gcc Ala	gct Ala	gtt Val	ctt Leu	gct Ala	6299
1920	1925										1930				
gtt Val	gac Asp	acc Thr	ggg Gly	gcg Ala	gga Gly	gat Asp	caa Gln	atg Met	atc Ile	tgt Cys	gca Ala	tac Tyr	ttt Phe	acg Thr	6344
1935	1940										1945				
gct Ala	gat Asp	cag Gln	gag Glu	ctt Leu	tcg Ser	agc Ser	caa Gln	gag Glu	ctt Leu	cgc Arg	cga Arg	cat His	gcg Ala	gca Ala	6389
1950	1955										1960				
gaa Glu	ggt Gly	ctg Leu	cca Pro	ggc Gly	tat Tyr	atg Met	atc Ile	ccg Pro	tct Ser	gtg Val	ttt Phe	atg Met	cag Gln	ctt Leu	6434
1965	1970										1975				
gat Asp	gag Glu	ctt Leu	ccg Pro	ctc Leu	aca Thr	ggc Gly	aat Asn	gga Gly	aag Lys	atc Ile	gac Asp	aga Arg	agg Arg	gcg Ala	6479
1980	1985										1990				
ctg Leu	cct Pro	gaa Glu	ccg Pro	gat Asp	atc Ile	gcg Ala	cag Gln	gcc Ala	gcg Ala	caa Gln	aag Lys	gaa Glu	tat Tyr	acg Thr	6524
1995	2000										2005				
gcg Ala	cca Pro	agg Arg	agc Ser	ggc Gly	aca Thr	gaa Glu	gcg Ala	cag Gln	ctt Leu	gcc Ala	gat Asp	ctt Leu	tgg Trp	cag Gln	6569

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2010	2015	2020	
gag Glu	gtg Val 2025	ctc Leu	aat Asn
	gta Val	ccg Pro	aaa Lys 2030
		atc Ile	ggt Gly
		gtg Val	cat His
		gac Asp 2035	aat Asn
		ttt Phe	ttt Phe
			6614
gaa Glu	ctc Leu 2040	ggc Gly	gga Gly
	cac His	tct Ser	tta Leu 2045
		ctc Leu	gga Gly
		atg Met	acg Thr
		ctc Leu 2050	atc Ile
		gcc Ala	cgc Arg
			6659
atc Ile	cag Gln 2055	caa Gln	gag Glu
	atg Met	aat Asn	gtt Val 2060
		gac Asp	ctg Leu
		cag Gln	ctg Leu
		aaa Lys 2065	gac Asp
		ttg Leu	ttc Phe
			6704
cag Gln	gcg Ala 2070	ccg Pro	aca Thr
	atc Ile	gaa Glu	agc Ser 2075
		ctg Leu	gcc Ala
		cag Gln	gcg Ala
		gcg Ala 2080	gca Ala
		aaa Lys	tct Ser
			6749
gag Glu	aaa Lys 2085	aaa Lys	tct Ser
	gcc Ala	gtt Val	tat Tyr 2090
		att Ile	gaa Glu
		gcg Ala	gcg Ala
		ccg Pro 2095	gac Asp
		cgg Arg	gaa Glu
			6794
acg Thr	tac Tyr 2100	ccc Pro	gtt Val
	gtt Ser	tcg Ser	tcg Ser
		gcg Ala 2105	caa Gln
		aaa Lys	cgg Arg
		ctg Leu	ctg Leu
		tac Tyr 2110	gtt Val
		ctt Leu	cag Gln
			6839
cag Gln	att Ile 2115	gaa Glu	ggc Gly
	gct Ala	gag Glu	aaa Lys 2120
		agc Ser	tat Tyr
		aac Asn	atg Met
		ccg Pro 2125	gcc Ala
		gtt Val	ctc Leu
			6884
caa Gln	ctt Leu 2130	gaa Glu	gga Gly
	aag Lys	ctt Leu	gac Asp 2135
		ctg Leu	aag Lys
		cgc Arg	ctg Leu
		gag Glu 2140	tct Ser
		gcc Ala	gcg Ala
			6929
caa Gln	atg Met 2145	ctg Leu	atc Ile
	aag Lys	cgc Arg	cat His 2150
		gaa Glu	gcg Ala
		ttc Phe	cgc Arg
		acg Thr 2155	acg Thr
		ttt Phe	gaa Glu
			6974
atc Ile	agg Arg 2160	aac Asn	ggc Gly
	gaa Glu	cct Pro	gtt Val 2165
		cag Gln	cgg Arg
		att Ile	tgg Trp
		gaa Glu 2170	gct Ala
		gcg Ala	gaa Glu
		aag Lys	
			7019
ttg Leu	acc Thr 2175	att Ile	gat Asp
	gtc Val	atc Ile	gat Asp 2180
		gca Ala	gat Asp
		gaa Glu	caa Gln
		gaa Glu 2185	gcg Ala
		gaa Glu	aag Lys
			7064
ctg Leu	att Ile 2190	aaa Lys	gag Glu
	ttc Phe	atc Ile	agg Arg 2195
		ccg Pro	ttt Phe
		gat Asp	tta Leu
		aca Thr 2200	aag Lys
		gct Ala	gct Ala
		ccg Pro	
			7109
tta Leu	ttt Phe 2205	aga Arg	atg Met
	agc Ser	atc Ile	ata Ile 2210
		cgt Arg	gtc Val
		acg Thr	gaa Glu
		gaa Glu 2215	aaa Lys
		cat His	ctt Leu
			7154
ttg Leu	ctt Leu 2220	gtc Val	gat Asp
	atg Met	cat His 2225	atc Ile
		att Ile	tca Ser
		gac Asp	ggc Gly 2230
		gct Ala	gct Ala
		tcc Ser	gtc Val
			7199
agc Ser	gtg Val 2235	ctg Leu	atc Ile
	gat Asp	gag Glu	atg Met 2240
		aca Thr	agg Arg
		ctt Leu	tat Tyr
		gcg Ala 2245	gga Gly
		gag Glu	gcg Ala
			7244
ctt Leu	gaa Glu 2250	ccg Pro	ctg Leu
	agg Arg	att Ile	cag Gln 2255
		tat Tyr	aaa Lys
		gac Asp	tat Tyr
		gct Ala 2260	gta Val
		tgg Trp	cag Gln
			7289
cag Gln	cac His	ttg Leu	ctc Leu
	act Thr	gaa Glu	cgg Arg
		cac His	aaa Lys
		atg Met	cag Gln
		gag Glu	gaa Glu
		tac Tyr	tgg Trp
			7334

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2265	2270	2275	7379
ctc aag gag ctt gac ggc gaa	ctg cct gtt ttg acg	ctc ccg aca	
Leu Lys Glu Leu Asp Gly Glu	Leu Pro Val Leu Thr	Leu Pro Thr	
2280	2285	2290	
gac tat ccg cgt cct tct gtt	caa acg ttt gaa gga	agc cgt atc	7424
Asp Tyr Pro Arg Pro Ser Val	Gln Thr Phe Glu Gly	Ser Arg Ile	
2295	2300	2305	
agc ttt tct ctg aaa ccg gag	ctt gtc cag cag ctc	aga aga ctg	7469
Ser Phe Ser Leu Lys Pro Glu	Leu Val Gln Gln Leu	Arg Arg Leu	
2310	2315	2320	
gcc aag gaa acg gaa agc act	tta tac atg gtg ctc	gct gcc tca	7514
Ala Lys Glu Thr Glu Ser Thr	Leu Tyr Met Val Leu	Ala Ala Ser	
2325	2330	2335	
tac agt acg ttt tta tcg aaa	ctg agt gga cag agc	gag gtc att	7559
Tyr Ser Thr Phe Leu Ser Lys	Leu Ser Gly Gln Ser	Glu Val Ile	
2340	2345	2350	
ttc ggc tct ccg gct gcc ggg	agg ccg cat gca gat	ttg agc cgt	7604
Phe Gly Ser Pro Ala Ala Gly	Arg Pro His Ala Asp	Leu Ser Arg	
2355	2360	2365	
atc atc ggc atg ttt gtc aat	acg ctt gcg ata aga	acg cgt cct	7649
Ile Ile Gly Met Phe Val Asn	Thr Leu Ala Ile Arg	Thr Arg Pro	
2370	2375	2380	
gaa gga gac aag ccg ttt tct	gca ttc ctt gag gaa	gta aaa gaa	7694
Glu Gly Asp Lys Pro Phe Ser	Ala Phe Leu Glu Glu	Val Lys Glu	
2385	2390	2395	
acg acg ctc ggc gca ttt gag	cat caa gat tac ccg	ttt gaa gaa	7739
Thr Thr Leu Gly Ala Phe Glu	His Gln Asp Tyr Pro	Phe Glu Glu	
2400	2405	2410	
ctg atc gag aag ctg aac atc	cag cgc gac atg agc	cga aac ccg	7784
Leu Ile Glu Lys Leu Asn Ile	Gln Arg Asp Met Ser	Arg Asn Pro	
2415	2420	2425	
tta ttt gat gcc gtc ttt tca	atg caa aat gcc gat	ttg aaa gac	7829
Leu Phe Asp Ala Val Phe Ser	Met Gln Asn Ala Asp	Leu Lys Asp	
2430	2435	2440	
ttg tca atg gaa gga gtc aca	ctt aaa ccg tat gat	ttt gcc cat	7874
Leu Ser Met Glu Gly Val Thr	Leu Lys Pro Tyr Asp	Phe Ala His	
2445	2450	2455	
cag act gcg aaa ttt gat ctg	acg ttg aca gcg gcg	gaa gaa gac	7919
Gln Thr Ala Lys Phe Asp Leu	Thr Leu Thr Ala Ala	Glu Glu Asp	
2460	2465	2470	
gga ctt ctc gtt ttt gaa atg	gaa tac aat aca gat	ctc ttt aag	7964
Gly Leu Leu Val Phe Glu Met	Glu Tyr Asn Thr Asp	Leu Phe Lys	
2475	2480	2485	
cgc gaa tcg atc aaa ccg tgg	agc ggg tac tgg gtc	aac ctg ctc	8009
Arg Glu Ser Ile Lys Arg Trp	Ser Gly Tyr Trp Val	Asn Leu Leu	
2490	2495	2500	
gaa gcg gtt gcc gaa acc ccg	gat gca agt ctt tca	gac ctt tcg	8054
Glu Ala Val Ala Glu Thr Pro	Asp Ala Ser Leu Ser	Asp Leu Ser	
2505	2510	2515	
ctt ctg gat gaa gcg gaa aaa	cgg cgg atc gtc caa	aag tgg aat	8099
Leu Leu Asp Glu Ala Glu Lys	Arg Arg Ile Val Gln	Lys Trp Asn	

10297.204.ST25.txt															
2520							2525							2530	
gag	acg	aag	ctc	gct	gtg	ccg	cag	gac	aaa	acg	gtc	cat	gag	ctg	8144
Glu	Thr	Lys	Leu	Ala	Val	Pro	Gln	Asp	Lys	Thr	Val	His	Glu	Leu	
2535							2540							2545	
ttc	gaa	gcg	caa	gtc	ctc	cgc	act	cct	gac	cgc	ggg	gca	gcg	gtg	8189
Phe	Glu	Ala	Gln	Val	Leu	Arg	Thr	Pro	Asp	Arg	Gly	Ala	Ala	Val	
2550							2555							2560	
tac	aac	ggc	gtg	aag	tgg	acg	tac	aaa	gag	ctg	aac	gcg	cgc	gcc	8234
Tyr	Asn	Gly	Val	Lys	Trp	Thr	Tyr	Lys	Glu	Leu	Asn	Ala	Arg	Ala	
2565							2570							2575	
aac	cgt	ctg	gcc	cgc	ctg	ctg	att	gaa	aaa	gga	gcc	ggt	cct	gag	8279
Asn	Arg	Leu	Ala	Arg	Leu	Leu	Ile	Glu	Lys	Gly	Ala	Gly	Pro	Glu	
2580							2585							2590	
cag	cgg	gtc	gga	atc	atg	gtg	aag	cct	tcg	ctg	gaa	atg	gcg	gcc	8324
Gln	Arg	Val	Gly	Ile	Met	Val	Lys	Pro	Ser	Leu	Glu	Met	Ala	Ala	
2595							2600							2605	
ggc	gta	ctt	gcg	att	ttg	aaa	gcg	gga	gcg	gcc	tat	gta	ccg	atc	8369
Gly	Val	Leu	Ala	Ile	Leu	Lys	Ala	Gly	Ala	Ala	Tyr	Val	Pro	Ile	
2610							2615							2620	
gat	ccc	ggc	tat	ccg	gcc	gag	cgg	atc	gga	tac	gta	ctg	aaa	gac	8414
Asp	Pro	Gly	Tyr	Pro	Ala	Glu	Arg	Ile	Gly	Tyr	Val	Leu	Lys	Asp	
2625							2630							2635	
agc	ggt	gca	gaa	ctg	ctt	ctg	acg	caa	aca	aac	tta	gcc	gta	cct	8459
Ser	Gly	Ala	Glu	Leu	Leu	Leu	Thr	Gln	Thr	Asn	Leu	Ala	Val	Pro	
2640							2645							2650	
gaa	gaa	ttc	agc	ggt	gaa	acg	ctt	ctt	ctc	gat	tcg	atg	ctg	agc	8504
Glu	Glu	Phe	Ser	Gly	Glu	Thr	Leu	Leu	Leu	Asp	Ser	Met	Leu	Ser	
2655							2660							2665	
gaa	gaa	atc	aca	aat	gat	gat	gaa	gtg	aac	ccg	cag	gca	ggt	aca	8549
Glu	Glu	Ile	Thr	Asn	Asp	Asp	Glu	Val	Asn	Pro	Gln	Ala	Gly	Thr	
2670							2675							2680	
cag	cca	aac	aac	ctg	gca	tac	ttg	att	tac	aca	tcg	ggc	acg	aca	8594
Gln	Pro	Asn	Asn	Leu	Ala	Tyr	Leu	Ile	Tyr	Thr	Ser	Gly	Thr	Thr	
2685							2690							2695	
ggc	cag	ccg	aaa	ggc	gtc	atg	gtc	gaa	cat	caa	tcg	ctc	gtg	aac	8639
Gly	Gln	Pro	Lys	Gly	Val	Met	Val	Glu	His	Gln	Ser	Leu	Val	Asn	
2700							2705							2710	
ttg	tgc	tat	tgg	cat	aac	gat	gca	ttc	gcg	gtc	acc	gaa	cag	gac	8684
Leu	Cys	Tyr	Trp	His	Asn	Asp	Ala	Phe	Ala	Val	Thr	Glu	Gln	Asp	
2715							2720							2725	
aaa	agc	gcg	aaa	tat	gcc	ggc	ttc	ggc	ttt	gac	gct	tcc	gtc	tgg	8729
Lys	Ser	Ala	Lys	Tyr	Ala	Gly	Phe	Gly	Phe	Asp	Ala	Ser	Val	Trp	
2730							2735							2740	
gag	atg	ttc	ccg	tac	tgg	atc	gcc	gga	gcg	gag	ctt	cat	atc	att	8774
Glu	Met	Phe	Pro	Tyr	Trp	Ile	Ala	Gly	Ala	Glu	Leu	His	Ile	Ile	
2745							2750							2755	
gat	gaa	gcg	atc	cgg	atg	gac	att	acg	cgt	ttg	aat	gaa	tat	ttc	8819
Asp	Glu	Ala	Ile	Arg	Met	Asp	Ile	Thr	Arg	Leu	Asn	Glu	Tyr	Phe	
2760							2765							2770	
gaa	gag	aac	gga	ata	acg	atc	acg	ttc	ctg	ccg	aca	cag	ctg	tgc	8864
Glu	Glu	Asn	Gly	Ile	Thr	Ile	Thr	Phe	Leu	Pro	Thr	Gln	Leu	Cys	

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2775	2780	2785	
gaa Glu	cag Gln 2790	ttc atg gag ctc Phe Met Glu Leu	8909
gac Asp 2795	aac cag tgc ctg Asn Gln Ser Leu	cgc Arg 2800	
acg Thr	ggc Gly 2805	gga gac aag ctg Gly Asp Lys Leu	8954
aag Lys 2810	cgg atc gaa aaa Arg Ile Glu Lys	cgg Arg 2815	
ctc Leu	gtc Val 2820	aac aac tat ggg Asn Asn Tyr Gly	8999
ccg Pro	gaa gac aac aca Thr Glu Asn Thr	gtc Val 2830	
agc Ser	aca Thr 2835	gca atc gat cct Ala Ile Asp Pro	9044
gat Asp 2840	gaa ggc atg ctt Glu Gly Met Leu	tgc Ser 2845	
ccg Pro	att Ile 2850	gct aat acg cgg Ala Asn Thr Arg	9089
gcg Ala 2855	tat gtg ctt gga Tyr Val Leu Gly	caa Gln 2860	
ggt Val	cag Gln 2865	cct gtc ggc gtc Pro Val Gly Val	9134
gct Ala 2870	ggc gag ctg tgc Gly Glu Leu Cys	atc Ile 2875	
ggg Gly	ctt Leu 2880	gcg cgc ggc tat Ala Arg Gly Tyr	9179
ctg Leu 2885	aac aag ccg gag Asn Lys Pro Glu	gaa Glu 2890	
cgt Arg	ttt Phe 2895	acg gaa gac ccg Thr Glu Asp Pro	9224
ttt Phe 2900	gtg ccg ggc gag Val Pro Gly Glu	cgc Arg 2905	
aca Thr	ggg Gly 2910	gat gcg gtc aaa Asp Ala Val Lys	9269
tgg Trp 2915	ctg gaa gac ggg Leu Glu Asp Gly	cgg Arg 2920	
atc Ile	ggc Gly 2925	cgg atc gac cag Arg Ile Asp Gln	9314
cag Gln 2930	gtg aaa atc cgc Val Lys Ile Arg	ggc Gly 2935	
gag Glu	ctt Leu 2940	tct gaa att gaa Ser Glu Ile Glu	9359
gtc Val 2945	cag ctc gcg ccg Gln Leu Ala Arg	ctc Leu 2950	
cag Gln 2955	gaa gac gac gcc Glu Glu Asp Ala	tac Tyr 2965	9404
gac Asp 2960	atc gaa gac gcc Ile Glu Asp Ala	gtc Gly 2970	
gcg Ala	ctg Leu 2970	tgc ggc tat gtc Cys Gly Tyr Val	9449
gtt Val 2975	gcg gac gaa cag Ala Asp Glu Gln	ctt Leu 2980	
agc Ser	ctc Leu 2985	gcc cgt aag ctg Ala Arg Lys Leu	9494
ggg Gly 2990	cag acg ctt ccg Gln Thr Leu Pro	gac Asp 2995	
ccg Pro	gcg Ala 3000	tat tgg gtg cag Tyr Trp Val Gln	9539
ctt Leu 3005	gat gag ctt ccg Asp Glu Leu Pro	gtt Val 3010	
gga Gly	aaa Lys 3015	gtc gac cga agg Val Asp Arg Arg	9584
gcg Ala 3020	ctg cct cag cct Leu Pro Gln Pro	gac Asp 3025	
cag Gln	aca Thr	gaa acg Glu Thr	9629
gcc Ala	gaa Glu	tac Tyr	
aaa Lys	aaa Lys	gcg Ala	
ccg Pro	cgc Arg	aca Thr	
gaa Glu	acg Thr	gaa Glu	
cag Gln	ctg Leu		

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3030	3035	3040	
ttg gcg gac att tgg cag gat gtt ctc ggc ata gac cga atc gga Leu Ala Asp Ile Trp Gln Asp Val Leu Gly Ile Asp Arg Ile Gly 3045 3050 3055			9674
gtc acg gac aat ttc ttc gcg ctc ggc ggg gac tcg atc aaa gga Val Thr Asp Asn Phe Phe Ala Leu Gly Gly Asp Ser Ile Lys Gly 3060 3065 3070			9719
att caa atg gca agc cgc ctt cag cag cac ggt tgg aag ctg gag Ile Gln Met Ala Ser Arg Leu Gln Gln His Gly Trp Lys Leu Glu 3075 3080 3085			9764
atg aag gac ttg ttt cag cac ccg acg atc ggg gag ctc agt gct Met Lys Asp Leu Phe Gln His Pro Thr Ile Gly Glu Leu Ser Ala 3090 3095 3100			9809
tat gtt caa gcg gct gac gat cag ccg atc gat cag aac cct gtc Tyr Val Gln Ala Ala Asp Asp Gln Pro Ile Asp Gln Asn Pro Val 3105 3110 3115			9854
gaa ggc gaa gtc aca ctg acg ccg atc cag cgc tgg ttc ttt gag Glu Gly Glu Val Thr Leu Thr Pro Ile Gln Arg Trp Phe Phe Glu 3120 3125 3130			9899
cgc aaa ttt acg aac gag cat cat tgg aac caa tca gtt atg ctt Arg Lys Phe Thr Asn Glu His His Trp Asn Gln Ser Val Met Leu 3135 3140 3145			9944
cac gcc cct tca ggg ttt gac ccg gaa gcg gca ggc aag gct tta His Ala Pro Ser Gly Phe Asp Pro Glu Ala Ala Gly Lys Ala Leu 3150 3155 3160			9989
acc aag atg atc gaa cac cat gat gca ctt cgc atg gtt tat cag Thr Lys Met Ile Glu His His Asp Ala Leu Arg Met Val Tyr Gln 3165 3170 3175			10034
cga aat gga gac ggg att gtt cag tac aac aga ggg ctg gaa gaa Arg Asn Gly Asp Gly Ile Val Gln Tyr Asn Arg Gly Leu Glu Glu 3180 3185 3190			10079
aca gcg gtt cgt cct gaa gtc atc cgc ttc aat gaa tcg ggt gct Thr Ala Val Arg Pro Glu Val Ile Arg Phe Asn Glu Ser Gly Ala 3195 3200 3205			10124
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gcc ggg tac gcc caa gct gaa aaa ggg gag ccg atc att ctt caa Ala Gly Tyr Ala Gln Ala Glu Lys Gly Glu Pro Ile Ile Leu Gln 3270 3275 3280			10349
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10297.204.ST25.txt															
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gaa Glu	gtc Val 3315	gag Glu	aag Lys	gcg Ala	gag Glu	acg Thr 3320	gca Ala	tcg Ser	ctc Leu	cct Pro	aaa Lys 3325	gat Asp	gat Asp	gaa Glu	10484
gca Ala	gag Glu 3330	gac Asp	aaa Lys	cgg Arg	atg Met	cac His 3335	cat His	acg Thr	aaa Lys	acg Thr	gct Ala 3340	gag Glu	ttt Phe	tct Ser	10529
ctc Leu	tcg Ser 3345	aaa Lys	gaa Glu	gaa Glu	aca Thr	gaa Glu 3350	cag Gln	ttg Leu	atg Met	aca Thr	aaa Lys 3355	gtt Val	cat His	gaa Glu	10574
gca Ala	tat Tyr 3360	aac Asn	acg Thr	gaa Glu	atg Met	aac Asn 3365	gac Asp	att Ile	ttg Leu	ctt Leu	acg Thr 3370	gcg Ala	ttg Leu	ggc Gly	10619
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ttg Leu	gag Glu 3390	gga Gly	cac His	ggc Gly	cgg Arg	gag Glu 3395	gac Asp	atc Ile	atg Met	gaa Glu	ggc Gly 3400	ttg Leu	aat Asn	att Ile	10709
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caa Gln	ctg Leu 3420	cgc Arg	cat His	tcc Ser	gaa Glu	gat Asp 3425	atc Ile	ggc Gly	tat Tyr	caa Gln	atc Ile 3430	aaa Lys	cag Gln	atc Ile	10799
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ccg Pro	ctc Leu 3495	agc Ser	ccg Pro	gaa Glu	acg Thr	gaa Glu 3500	aaa Lys	ccg Pro	aat Asn	gcg Ala	cta Leu 3505	gac Asp	atc Ile	gtc Val	11024
ggc Gly	tat Tyr 3510	atc Ile	gaa Glu	aac Asn	ggc Gly	att Ile 3515	ttg Leu	aca Thr	atg Met	tca Ser	att Ile 3520	gcc Ala	tat Tyr	cat His	11069
tca Ser	ctc Leu 3525	gaa Glu	tac Tyr	aaa Lys	gaa Glu	agc Ser 3530	acc Thr	gtc Val	gcc Ala	gct Ala	gtc Val 3535	gcc Ala	gca Ala	agc Ser	11114
ttt Phe	aaa Lys	act Thr	tat Tyr	ttg Leu	ctg Leu	caa Gln	ttg Leu	atc Ile	gat Asp	cat His	tgc Cys	tta Leu	gag Glu	ctg Leu	11159

10297.204.ST25.txt

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acg ctt gaa gaa tta gat aaa ctg atg gaa att ttc taacaaaaaa 11250
 Thr Leu Glu Glu Leu Asp Lys Leu Met Glu Ile Phe
 3570 3575 3580

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 aatttggcga aagacatgct gtttaaaacg gcggtctttc ggcttgaccg gaaaaaatac 11670
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 aaacgccttt 11740

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 <212> PRT
 <213> Bacillus licheniformis

<400> 14

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Tyr Thr Glu Lys Phe Tyr Pro Gly Thr Ser Val Ser Asn Leu Ser Gly
 20 25 30

Phe Gly Lys Leu Lys Ser Ala Ser Gly Ile Asp Ser Gly Leu Leu Thr
 35 40 45

Glu Ala Ile Arg Lys Phe Val Arg Thr Asn Asp Thr Met Arg Phe Arg
 50 55 60

Leu Met Phe Glu Gly Glu Asp Glu Pro Lys Gln Tyr Ile Ala Glu Asp
 65 70 75 80

Glu Pro Phe Gln Ile Glu Tyr Phe Asp Ala Ser Glu Ser Gly Gly Ala
 85 90 95

Asp Gly Val Leu Lys Trp Gly Gln Ala Glu Ala Arg Arg Pro Leu Pro
 100 105 110

Leu Tyr Asp Ser Pro Leu Phe Lys Phe Ala Val Val Arg Ile Ser Glu
 115 120 125

10297.204.ST25.txt

Glu Glu Ser Trp Phe Phe Ala Lys Val His His Ile Ile Ser Asp Gly
 130 135 140

Ile Ser Met Thr Ile Leu Gly Asn Arg Ile Thr Asp Ile Tyr Leu Lys
 145 150 155 160

Leu Ala Lys Gly Glu Thr Asp Leu Glu Pro Val Gln Ser Ser Phe Thr
 165 170 175

Glu His Ile Gln Ser Glu Leu Glu Tyr Glu Asn Ser Lys Arg Phe Gln
 180 185 190

Lys Asp Lys Ala Tyr Trp Asn Ala Gln Tyr Glu Ala Ile Pro Glu Pro
 195 200 205

Val Ser Leu Lys Ala Ser Asp Thr Tyr Gln Ile Gln Leu Asp Ala Ala
 210 215 220

Arg Phe Ser Lys Glu Ile Ser Pro Asp Leu Tyr Lys Lys Ile Gln Thr
 225 230 235 240

Tyr Cys Asn Glu His Asn Ile Ser Val Leu Ser Leu Phe Leu Ser Ile
 245 250 255

Leu His Ile Tyr Met His Arg Val Thr Gly Gln Lys Asp Val Val Leu
 260 265 270

Gly Thr Phe Met Gly Asn Arg Thr Asn Ala Lys Glu Lys Gln Met Leu
 275 280 285

Gly Met Phe Val Ser Thr Ile Pro Met Lys Ala Ser Ile Glu Val His
 290 295 300

Gln Asp Phe Ser Ala Phe Val Gln Glu Arg Met Lys Asp Gln Leu Lys
 305 310 315 320

Ile Ile Arg His Gln Lys Tyr Pro Tyr Asn Leu Leu Ile Asn Asp Leu
 325 330 335

Arg Glu Arg Gln Pro His Val Ser Lys Leu Phe Ala Val Ser Leu Glu
 340 345 350

Tyr Gln Val Met Gln Trp Gln Gln Lys Glu Thr Val Ser Phe Leu Thr
 355 360 365

Glu Pro Ile Phe Ser Gly Ser Glu Val Asn Asp Ile Ser Ile His Val
 370 375 380

Lys Glu Arg Trp Asp Thr Gly Thr Leu Ala Ile Asp Phe Asp Tyr Arg
 385 390 395 400

10297.204.ST25.txt

Glu Glu Leu Phe Thr Ser Glu Glu Met Ala Val Leu Tyr Glu Arg Leu
 405 410 415

Met Thr Leu Leu Glu Asp Ala Leu Leu Ser Pro Gln Lys Thr Ile Ala
 420 425 430

Glu Leu Glu Ile Val Pro Ala Phe Glu Lys Glu Arg Leu Leu Lys Arg
 435 440 445

Ala Ser Ser Gln Thr Ile Ala Tyr Asp Lys Asn Met Thr Leu His Gly
 450 455 460

Leu Phe Glu Gln Lys Ala Ala Asp His Pro Glu Lys Thr Ala Val Val
 465 470 475 480

Tyr Glu Gly Gln Lys Leu Ser Tyr Arg Glu Leu Asn Glu Gln Ser Ser
 485 490 495

Arg Leu Ala Met Ala Leu Arg Arg Arg Gly Ile Gly Pro Asp Ala Pro
 500 505 510

Ala Ala Ile Val Met Glu Arg Ser Glu Arg Val Ile Thr Ala Met Met
 515 520 525

Gly Val Leu Lys Ala Gly Gly Ala Tyr Val Pro Ile Asp Pro Gly Phe
 530 535 540

Pro Glu Glu Arg Ile Arg Phe Met Leu Glu Asp Ser Lys Ala Lys Ala
 545 550 555 560

Val Ile Thr Asp Ser Gly Leu Thr Phe Glu Thr Ala Glu Thr Val Gln
 565 570 575

Phe Ser Glu Ala Leu Ser Glu Ser Arg Glu Asn Gly Tyr Pro Ser Ser
 580 585 590

Ala Ala Gly Ala Gly His Leu Ala Tyr Ile Ile Tyr Thr Ser Gly Thr
 595 600 605

Thr Gly Arg Pro Lys Gly Val Met Ile Glu His Arg Gln Val His His
 610 615 620

Leu Val Arg Gly Leu Gln Gln Ala Val Gly Thr Tyr Asp Gln Asp Asp
 625 630 635 640

Leu Lys Leu Ala Leu Leu Ala Pro Phe His Phe Asp Ala Ser Val Gln
 645 650 655

Gln Ile Phe Thr Ser Leu Leu Leu Gly Gln Thr Leu Tyr Ile Val Pro
 660 665 670

10297.204.ST25.txt

Lys Lys Thr Val Ser Asp Gly Arg Ala Leu Ser Asp Tyr Tyr Arg Arg
 675 680 685

His Gln Ile Asp Val Thr Asp Gly Thr Pro Ala His Leu Gln Leu Leu
 690 695 700

Ala Ala Ala Asp Asp Leu Ser Gly Val Lys Leu Arg His Met Leu Val
 705 710 715 720

Gly Gly Glu Ala Leu Ser Arg Val Ala Thr Glu Arg Leu Leu Gln Leu
 725 730 735

Phe Ala Glu Thr Ala Glu Ser Val Pro Ala Val Thr Asn Val Tyr Gly
 740 745 750

Pro Thr Glu Thr Cys Val Asp Ala Ser Ser Phe Thr Ile Thr Asn Arg
 755 760 765

Thr Asp Leu Gln Tyr Asp Thr Ala Tyr Val Pro Ile Gly Arg Pro Ile
 770 775 780

Gly Asn Asn Arg Phe Tyr Ile Leu Asp Glu Asn Gly Ala Leu Leu Pro
 785 790 795 800

Asp Gly Val Glu Gly Glu Leu Tyr Ile Ala Gly Asp Gly Val Gly Arg
 805 810 815

Gly Tyr Leu Asn Leu Pro Asp Met Thr Arg Asp Arg Phe Leu Lys Asp
 820 825 830

Pro Phe Val Ser Gly Gly Leu Met Tyr Arg Thr Gly Asp Thr Ala Arg
 835 840 845

Trp Leu Pro Asp Gly Thr Val Asp Phe Ile Gly Arg Arg Asp Asp Gln
 850 855 860

Val Lys Ile Arg Gly Phe Arg Ile Glu Leu Gly Glu Ile Glu Ser Val
 865 870 875 880

Leu Gln Gly Ala Pro Ala Val Glu Lys Ala Val Val Leu Ala Arg His
 885 890 895

Glu Thr Gly Gly Ser Leu Glu Val Cys Ala Tyr Val Val Pro Lys Gln
 900 905 910

Gly Gly Lys Ile His Ile Gln Gly Leu Arg Glu His Leu Ser Lys His
 915 920 925

Leu Pro Asp Tyr Met Ile Pro Ser Cys Phe Val Glu Leu Asn Glu Ile
 930 935 940

10297.204.ST25.txt

Pro Leu Thr Ala Ser Gly Lys Val Asp Arg Lys Ala Leu Leu Arg His
 945 950 955 960

Glu Val Ser Val Ser Gly Thr Ala Glu Tyr Ala Ala Pro Arg Asn Glu
 965 970 975

Cys Glu Glu Lys Met Val Gly Ile Trp Gln Glu Val Leu Gly Ala Glu
 980 985 990

Gln Val Gly Ile His Asp Gln Phe Phe Asp Leu Gly Gly His Ser Leu
 995 1000 1005

Lys Ala Met Thr Met Leu Ala Lys Ile His Lys Ala Phe Gly Val
 1010 1015 1020

Glu Val Pro Leu Gln Val Leu Phe Glu Lys Pro Thr Val Ala Ala
 1025 1030 1035

Leu Ser Gly Phe Val Ser Glu Ala Glu Lys Asp Gly Phe Ala Val
 1040 1045 1050

Ile Glu Pro Ala Pro Glu Ser Asp Asp Tyr Pro Leu Ser Leu Ala
 1055 1060 1065

Gln Gln Arg Ile Tyr Ile Val Ser Gln Leu Glu Gly Val Gly Tyr
 1070 1075 1080

Asn Met Pro Ala Ala Ala Met Leu Glu Gly Thr Leu Asp Ser Gly
 1085 1090 1095

Arg Leu Glu Ala Ala Phe Gln Lys Leu Ile Asp Arg His Glu Ala
 1100 1105 1110

Leu Arg Thr Ser Phe Thr Val Val Asp Gly Glu Pro Arg Gln Thr
 1115 1120 1125

Val His Gln Arg Val Gln Phe Lys Ile Glu Lys Val Lys Ala Glu
 1130 1135 1140

Gly Lys Pro Ile Glu Gln Ile Ala Lys Ser Phe Val Arg Arg Phe
 1145 1150 1155

Asp Leu Ala Lys Ala Pro Leu Met Arg Ala Gly Leu Val Ser Leu
 1160 1165 1170

Ala Asp Gly Arg His Leu Leu Leu Phe Asp Met His His Leu Val
 1175 1180 1185

Ser Asp Gly Val Ser Ile Ser Ile Ile Leu Asn Glu Leu Ala Ala
 1190 1195 1200

10297.204.ST25.txt

Leu Tyr Asn Gly Glu Glu Leu Pro Glu Leu Arg Leu His Tyr Lys
 1205 1210 1215
 Asp Tyr Ala Phe Trp Gln Arg Ala Gln Ala Gln Glu Gly Phe Gln
 1220 1225 1230
 Lys Glu Glu Ala Tyr Trp Glu Ser Met Phe Ala Gly Glu Leu Pro
 1235 1240 1245
 Val Leu Gln Leu Met Thr Asp Glu Pro Arg Pro Pro Val Gln Ser
 1250 1255 1260
 Phe Glu Gly Asp Arg Val Ser Ala Val Leu Pro Lys Asp Leu Lys
 1265 1270 1275
 Glu Lys Leu Ala Val Leu Ala Glu Gln Asn Gly Ala Thr Leu Tyr
 1280 1285 1290
 Met Val Met Leu Ser Ala Tyr Asn Met Leu Leu Ala Lys Tyr Ser
 1295 1300 1305
 Gly Gln Glu Asp Val Ile Val Gly Thr Pro Ala Ala Gly Arg Arg
 1310 1315 1320
 His Ser Asp Leu Glu Gly Ile Ile Gly Met Phe Val Asn Thr Leu
 1325 1330 1335
 Ala Ile Arg Ser Lys Val Asp Pro Gly Arg Thr Phe Ala Asp Phe
 1340 1345 1350
 Leu Asn Asp Val Lys Lys Thr Val Ile Asp Ala Phe Glu His Gln
 1355 1360 1365
 Asp Tyr Pro Phe Glu Arg Leu Ala Glu Lys Phe Gly Ala Ser Arg
 1370 1375 1380
 Asp Leu Ser Arg His Pro Ile Phe Asp Thr Met Phe Ile Leu Gln
 1385 1390 1395
 Asn Ala Trp Glu Asp Ile Pro Leu Leu Gly Asp Leu His Leu Ser
 1400 1405 1410
 Ile Tyr Glu Thr Asn Phe Asn Ile Ala Lys Phe Asp Leu Thr Leu
 1415 1420 1425
 Gln Ala Lys Glu Glu Gln Gly Glu Leu Ile Leu Asp Leu Asp Tyr
 1430 1435 1440
 Ser Thr Lys Leu Phe Lys Lys Asp Thr Ala Glu Arg Met Leu Lys
 1445 1450 1455

10297.204.ST25.txt

Ala Tyr Leu Asn Leu Leu Glu Asp Met Ala Ala Asp Pro Met Leu
1460 1465 1470

Arg Ile Gly Glu Tyr Ser Leu Leu Thr Glu Glu Glu Thr Asn Arg
1475 1480 1485

Gln Leu Val Ala Phe Asn Pro Ala Thr Ser Asp Tyr Pro Arg Glu
1490 1495 1500

Lys Thr Ile Val Gln Leu Phe Glu Glu Gln Ala Ala Glu Arg Gly
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Gly Tyr Pro Ala Leu Gln Phe Glu Asp Lys Val Trp Ser Tyr Asp
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Glu Leu Asn Arg Lys Ala Asn Gln Leu Ala Arg Arg Leu Arg Glu
1535 1540 1545

Ser Gly Val Gln Ala Gly Thr Thr Ala Ala Ile Leu Thr Ala Arg
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Ser Ala Glu Met Val Ile Gly Ile Leu Ala Val Leu Lys Ala Gly
1565 1570 1575

Gly Ala Tyr Val Pro Ile Asp Pro Asp His Pro Glu Lys Arg Val
1580 1585 1590

Gln His Phe Phe Lys Asp Ser Gly Ala Ala Val Leu Leu Thr Gln
1595 1600 1605

Lys Ala Met Lys Pro Leu Ala Glu Ala Ala Glu Phe Gly Gly Asp
1610 1615 1620

Ile Leu Phe Val Glu Asp Glu Asn Leu Tyr Met Gly Asp Ala Ser
1625 1630 1635

Asp Leu Arg Leu Pro Ile Ser Pro Glu Ala Met Ala Asn Leu Thr
1640 1645 1650

Tyr Thr Ser Gly Thr Thr Gly Thr Pro Lys Gly Asn Met Val Ser
1655 1660 1665

His Arg Asn Ile Leu Arg Thr Val Lys Asn Ala Asn Tyr Leu Glu
1670 1675 1680

Val Met Glu Ser Asp Ile Val Leu Ser Ile Ser Asn Tyr Val Phe
1685 1690 1695

Asp Ala Phe Met Phe Asp Val Phe Gly Ser Leu Leu Asn Gly Ala
1700 1705 1710

10297.204.ST25.txt

Lys Leu Val Ile Ala Pro Lys Asp Thr Ile Leu Asp Met Ser Arg
 1715 1720 1725
 Leu Ala His Val Leu Glu Lys Glu Lys Ile Thr Ile Leu Met Ile
 1730 1735 1740
 Thr Thr Ala Leu Phe Asn Leu Leu Thr Asp Met Arg Pro Asp Ser
 1745 1750 1755
 Leu Lys Gly Leu Arg Arg Val Leu Phe Gly Gly Glu Arg Ala Ser
 1760 1765 1770
 Val Asp His Val Arg Arg Ala Leu Lys Thr Val Gly Arg Gly Arg
 1775 1780 1785
 Leu Leu His Met Tyr Gly Pro Ser Glu Ser Thr Val Phe Thr Thr
 1790 1800
 Tyr His Pro Val Asn Glu Val Pro Asp Asp Ala Gln Ala Ile Pro
 1805 1810 1815
 Ile Gly Lys Pro Val Ser Asn Thr Glu Val Leu Ile Leu Asp Ser
 1820 1825 1830
 Phe Gly Asn Val Gln Pro Ala Gly Val Ala Gly Glu Leu Cys Val
 1835 1840 1845
 Gly Gly Asp Gly Leu Val Arg Gly Tyr Phe Asn Arg Pro Glu Leu
 1850 1855 1860
 Thr Ala Glu Lys Phe Thr Ala His Pro Phe Lys Thr Gly Glu Lys
 1865 1870 1875
 Ile Tyr Arg Thr Gly Asp Met Ala Arg Trp Leu Ala Asp Gly Cys
 1880 1885 1890
 Leu Glu Phe Ile Gly Arg Ile Asp His Gln Val Lys Ile Arg Gly
 1895 1900 1905
 Gln Arg Ile Glu Leu Gly Glu Ile Glu His His Leu Leu Thr His
 1910 1915 1920
 Asp Met Val Gln Glu Ala Ala Val Leu Ala Val Asp Thr Gly Ala
 1925 1930 1935
 Gly Asp Gln Met Ile Cys Ala Tyr Phe Thr Ala Asp Gln Glu Leu
 1940 1945 1950
 Ser Ser Gln Glu Leu Arg Arg His Ala Ala Glu Gly Leu Pro Gly
 1955 1960 1965

10297.204.ST25.txt

Tyr Met Ile Pro Ser Val Phe Met Gln Leu Asp Glu Leu Pro Leu
 1970 1975 1980

Thr Gly Asn Gly Lys Ile Asp Arg Arg Ala Leu Pro Glu Pro Asp
 1985 1990 1995

Ile Ala Gln Ala Ala Gln Lys Glu Tyr Thr Ala Pro Arg Ser Gly
 2000 2005 2010

Thr Glu Ala Gln Leu Ala Asp Leu Trp Gln Glu Val Leu Asn Val
 2015 2020 2025

Pro Lys Ile Gly Val His Asp Asn Phe Phe Glu Leu Gly Gly His
 2030 2035 2040

Ser Leu Leu Gly Met Thr Leu Ile Ala Arg Ile Gln Gln Glu Met
 2045 2050 2055

Asn Val Asp Leu Gln Leu Lys Asp Leu Phe Gln Ala Pro Thr Ile
 2060 2065 2070

Glu Ser Leu Ala Gln Ala Ala Ala Lys Ser Glu Lys Lys Ser Ala
 2075 2080 2085

Val Tyr Ile Glu Ala Ala Pro Asp Arg Glu Thr Tyr Pro Val Ser
 2090 2095 2100

Ser Ala Gln Lys Arg Leu Tyr Val Leu Gln Gln Ile Glu Gly Ala
 2105 2110 2115

Glu Lys Ser Tyr Asn Met Pro Ala Val Leu Gln Leu Glu Gly Lys
 2120 2125 2130

Leu Asp Leu Lys Arg Leu Glu Ser Ala Ala Gln Met Leu Ile Lys
 2135 2140 2145

Arg His Glu Ala Phe Arg Thr Thr Phe Glu Ile Arg Asn Gly Glu
 2150 2155 2160

Pro Val Gln Arg Ile Trp Glu Ala Ala Glu Leu Thr Ile Asp Val
 2165 2170 2175

Ile Asp Ala Asp Glu Gln Glu Ala Glu Lys Leu Ile Lys Glu Phe
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Ile Arg Pro Phe Asp Leu Thr Lys Ala Pro Leu Phe Arg Met Ser
 2195 2200 2205

Ile Ile Arg Val Thr Glu Glu Lys His Leu Leu Leu Val Asp Met
 2210 2215 2220

10297.204.ST25.txt

His His Ile Ile Ser Asp Gly Ala Ser Val Ser Val Leu Ile Asp
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Glu Met Thr Arg Leu Tyr Ala Gly Glu Ala Leu Glu Pro Leu Arg
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Ile Gln Tyr Lys Asp Tyr Ala Val Trp Gln Gln His Leu Leu Thr
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Glu Arg His Lys Met Gln Glu Glu Tyr Trp Leu Lys Glu Leu Asp
 2270 2275 2280

Gly Glu Leu Pro Val Leu Thr Leu Pro Thr Asp Tyr Pro Arg Pro
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Ser Val Gln Thr Phe Glu Gly Ser Arg Ile Ser Phe Ser Leu Lys
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Pro Glu Leu Val Gln Gln Leu Arg Arg Leu Ala Lys Glu Thr Glu
 2315 2320 2325

Ser Thr Leu Tyr Met Val Leu Ala Ala Ser Tyr Ser Thr Phe Leu
 2330 2335 2340

Ser Lys Leu Ser Gly Gln Ser Glu Val Ile Phe Gly Ser Pro Ala
 2345 2350 2355

Ala Gly Arg Pro His Ala Asp Leu Ser Arg Ile Ile Gly Met Phe
 2360 2365 2370

Val Asn Thr Leu Ala Ile Arg Thr Arg Pro Glu Gly Asp Lys Pro
 2375 2380 2385

Phe Ser Ala Phe Leu Glu Glu Val Lys Glu Thr Thr Leu Gly Ala
 2390 2395 2400

Phe Glu His Gln Asp Tyr Pro Phe Glu Glu Leu Ile Glu Lys Leu
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Asn Ile Gln Arg Asp Met Ser Arg Asn Pro Leu Phe Asp Ala Val
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Phe Ser Met Gln Asn Ala Asp Leu Lys Asp Leu Ser Met Glu Gly
 2435 2440 2445

Val Thr Leu Lys Pro Tyr Asp Phe Ala His Gln Thr Ala Lys Phe
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Asp Leu Thr Leu Thr Ala Ala Glu Glu Asp Gly Leu Leu Val Phe
 2465 2470 2475

10297.204.ST25.txt

Glu Met 2480	Glu Tyr Asn Thr	Asp 2485	Leu Phe Lys Arg	Glu 2490	Ser Ile Lys
Arg Trp 2495	Ser Gly Tyr Trp	Val 2500	Asn Leu Leu Glu	Ala 2505	Val Ala Glu
Thr Pro 2510	Asp Ala Ser Leu	Ser 2515	Asp Leu Ser Leu	Leu 2520	Asp Glu Ala
Glu Lys 2525	Arg Arg Ile Val	Gln 2530	Lys Trp Asn Glu	Thr 2535	Lys Leu Ala
Val Pro 2540	Gln Asp Lys Thr	Val 2545	His Glu Leu Phe	Glu 2550	Ala Gln Val
Leu Arg 2555	Thr Pro Asp Arg	Gly 2560	Ala Ala Val Tyr	Asn 2565	Gly Val Lys
Trp Thr 2570	Tyr Lys Glu Leu	Asn 2575	Ala Arg Ala Asn	Arg 2580	Leu Ala Arg
Leu Leu 2585	Ile Glu Lys Gly	Ala 2590	Gly Pro Glu Gln	Arg 2595	Val Gly Ile
Met Val 2600	Lys Pro Ser Leu	Glu 2605	Met Ala Ala Gly	Val 2610	Leu Ala Ile
Leu Lys 2615	Ala Gly Ala Ala	Tyr 2620	Val Pro Ile Asp	Pro 2625	Gly Tyr Pro
Ala Glu 2630	Arg Ile Gly Tyr	Val 2635	Leu Lys Asp Ser	Gly 2640	Ala Glu Leu
Leu Leu 2645	Thr Gln Thr Asn	Leu 2650	Ala Val Pro Glu	Glu 2655	Phe Ser Gly
Glu Thr 2660	Leu Leu Leu Asp	Ser 2665	Met Leu Ser Glu	Glu 2670	Ile Thr Asn
Asp Asp 2675	Glu Val Asn Pro	Gln 2680	Ala Gly Thr Gln	Pro 2685	Asn Asn Leu
Ala Tyr 2690	Leu Ile Tyr Thr	Ser 2695	Gly Thr Thr Gly	Gln 2700	Pro Lys Gly
Val Met 2705	Val Glu His Gln	Ser 2710	Leu Val Asn Leu	Cys 2715	Tyr Trp His
Asn Asp 2720	Ala Phe Ala Val	Thr 2725	Glu Gln Asp Lys	Ser 2730	Ala Lys Tyr

10297.204.ST25.txt

Ala Gly Phe Gly Phe Asp Ala Ser Val Trp Glu Met Phe Pro Tyr
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Trp Ile Ala Gly Ala Glu Leu His Ile Ile Asp Glu Ala Ile Arg
 2750 2755 2760

Met Asp Ile Thr Arg Leu Asn Glu Tyr Phe Glu Glu Asn Gly Ile
 2765 2770 2775

Thr Ile Thr Phe Leu Pro Thr Gln Leu Cys Glu Gln Phe Met Glu
 2780 2785 2790

Leu Asp Asn Gln Ser Leu Arg Val Leu Leu Thr Gly Gly Asp Lys
 2795 2800 2805

Leu Lys Arg Ile Glu Lys Arg Asn Tyr Thr Leu Val Asn Asn Tyr
 2810 2815 2820

Gly Pro Thr Glu Asn Thr Val Val Ala Thr Ser Thr Ala Ile Asp
 2825 2830 2835

Pro Asp Glu Gly Met Leu Ser Ile Gly Lys Pro Ile Ala Asn Thr
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Arg Ala Tyr Val Leu Gly Gln Asn Asn Glu Val Gln Pro Val Gly
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Val Ala Gly Glu Leu Cys Ile Ala Gly Arg Gly Leu Ala Arg Gly
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Tyr Leu Asn Lys Pro Glu Glu Thr Ala Lys Arg Phe Thr Glu Asp
 2885 2890 2895

Pro Phe Val Pro Gly Glu Arg Met Tyr Arg Thr Gly Asp Ala Val
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Lys Trp Leu Glu Asp Gly Arg Leu Glu Tyr Ile Gly Arg Ile Asp
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Gln Gln Val Lys Ile Arg Gly Phe Arg Ile Glu Leu Ser Glu Ile
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Glu Val Gln Leu Ala Arg Leu Ser Glu Val Gln Glu Ala Val Val
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Arg Leu Gln Gln His Gly Trp Lys Leu Glu Met Lys Asp Leu Phe
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Gln His Pro Thr Ile Gly Glu Leu Ser Ala Tyr Val Gln Ala Ala
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Phe Asp Pro Glu Ala Ala Gly Lys Ala Leu Thr Lys Met Ile Glu
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Glu Gly Pro Leu Leu Lys Ala Ala Ile Phe Glu Thr Asp Gln Gly
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Phe Thr Arg Ser Ala Leu Pro Ser Gly Asp Pro Leu Ser Pro Glu
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gcg gaa aaa ttc gcg ccg cat ccg ttt aac agc ggt gaa acg atg tac Ala Glu Lys Phe Ala Pro His Pro Phe Asn Ser Gly Glu Thr Met Tyr 830 835 840				3029
agg acg gga gat ctg gcc cgc tgg ctg ccg gac ggc aat atc gac ttc Arg Thr Gly Asp Leu Ala Arg Trp Leu Pro Asp Gly Asn Ile Asp Phe 845 850 855				3077
atc ggg cgg atc gat gat caa gtg aaa atc cgc gga cac cgg att gag Ile Gly Arg Ile Asp Asp Gln Val Lys Ile Arg Gly His Arg Ile Glu 860 865 870 875				3125
ctc ggt gaa atc gaa gag cag ctg atg cgc tgc caa ggc gta aag gaa Leu Gly Glu Ile Glu Glu Gln Leu Met Arg Cys Gln Gly Val Lys Glu 880 885 890				3173
gcc gtt gta acc gcc agg aaa agc ggg aac ggg gat gcg gcg ctc acc Ala Val Val Thr Ala Arg Lys Ser Gly Asn Gly Asp Ala Ala Leu Thr 895 900 905				3221
gct tat gtc gtc ccg gtg cag gga act gag gtt gca aac gag gag gtt Ala Tyr Val Val Pro Val Gln Gly Thr Glu Val Ala Asn Glu Glu Val 910 915 920				3269
cgc cgc caa ttg gcg cgg agg cta ccg gct tac atg gtg ccg gct gcg Arg Arg Gln Leu Ala Arg Arg Leu Pro Ala Tyr Met Val Pro Ala Ala 925 930 935				3317
tat atc atg ctt gaa gag ctg ccg ctt acc gct aac gga aaa gtc aac Tyr Ile Met Leu Glu Glu Leu Pro Leu Thr Ala Asn Gly Lys Val Asn 940 945 950 955				3365
cga cgc ctt ctc cct gaa gcc gat ggc cgg ccg aat tca aca gag cgc Arg Arg Leu Leu Pro Glu Ala Asp Gly Arg Pro Asn Ser Thr Glu Arg 960 965 970				3413
cggt gca ccc cgc aat gct acg gaa gaa aag ctt gca gtg att tgg tct Arg Ala Pro Arg Asn Ala Thr Glu Glu Lys Leu Ala Val Ile Trp Ser 975 980 985 990				3461

10297.204.ST25.txt																
975					980					985						
gag Glu	gtt Val	ctc Leu 990	ggc Gly	aga Arg	cag Gln	cag Gln	atc Ile 995	gga Gly	ata Ile	gac Asp	gag Glu	aac Asn 1000	ttt Phe	ttt Phe	gaa Glu	3509
atc Ile	ggg Gly 1005	gga Gly	cat His	tca Ser	ttg Leu	aaa Lys 1010	gcc Ala	atg Met	gcc Ala	gtc Val	gcc Ala 1015	tcc Ser	cgg Arg	atg Met		3554
ctg Leu	aaa Lys 1020	gat Asp	ctc Leu	gca Ala	atc Ile	gat Asp 1025	gtt Val	ccg Pro	gtg Val	aat Asn	gtg Val 1030	ttg Leu	ttt Phe	gaa Glu		3599
atg Met	ccc Pro 1035	aca Thr	atc Ile	gag Glu	ggc Gly	ctc Leu 1040	gcg Ala	gct Ala	tat Tyr	atc Ile	gac Asp 1045	caa Gln	ggc Gly	ggc Gly		3644
cat His	gtg Val 1050	gat Asp	gaa Glu	gtg Val	aaa Lys	aaa Lys 1055	acc Thr	gtc Val	ttc Phe	aat Asn	cag Gln 1060	gca Ala	agc Ser	acc Thr		3689
cgc Arg	cat His 1065	ttg Leu	ttc Phe	gct Ala	ttc Phe	ccg Pro 1070	cct Pro	gtc Val	ctc Leu	gga Gly	tac Tyr 1075	ggc Gly	atc Ile	atg Met		3734
tac Tyr	ggc Gly 1080	aag Lys	ctg Leu	gcc Ala	gaa Glu	caa Gln 1085	atg Met	ccg Pro	gaa Glu	tac Tyr	agg Arg 1090	att Ile	cac His	gcg Ala		3779
ttc Phe	gac Asp 1095	ttt Phe	ata Ile	gaa Glu	agc Ser	gat Asp 1100	gac Asp	cgc Arg	gct Ala	gtg Val	cgc Arg 1105	tat Tyr	gca Ala	gaa Glu		3824
gcc Ala	atc Ile 1110	tcc Ser	gac Asp	ctt Leu	cag Gln	cct Pro 1115	gaa Glu	ggg Gly	ccg Pro	ctg Leu	aca Thr 1120	ttg Leu	atc Ile	ggc Gly		3869
tat Tyr	tca Ser 1125	gcc Ala	ggc Gly	tgc Cys	gga Gly	ctt Leu 1130	gcc Ala	ttt Phe	gaa Glu	gtg Val	gcg Ala 1135	caa Gln	gcg Ala	ctc Leu		3914
gaa Glu	aag Lys 1140	aac Asn	gga Gly	ccg Arg	aag Lys	gtc Val 1145	gaa Glu	aag Lys	ctg Leu	ctg Leu	atg Met 1150	atc Ile	gac Asp	tca Ser		3959
tat Tyr	atg Met 1155	aag Lys	aac Asn	gat Asp	gtc Val	agc Ser 1160	gat Asp	tta Leu	gaa Glu	ggg Gly	cgg Arg 1165	tca Ser	att Ile	gaa Glu		4004
gcc Ala	gat Asp 1170	acg Thr	gcc Ala	gcc Ala	ttg Leu	atg Met 1175	gaa Glu	gcc Ala	aac Asn	aag Lys	gac Asp 1180	aat Asn	gaa Glu	tat Tyr		4049
atg Met	aaa Lys 1185	atc Ile	aag Lys	acg Thr	gtt Val	gcc Ala 1190	gat Asp	ggc Gly	atc Ile	gct Ala	aaa Lys 1195	aag Lys	atg Met	aca Thr		4094
gcc Ala	tat Tyr 1200	tat Tyr	tct Ser	tac Tyr	ttt Phe	gtc Val 1205	aat Asn	ctt Leu	gtc Val	cat His	caa Gln 1210	gga Gly	acg Thr	gtc Val		4139
agc Ser	tcg Ser 1215	gag Glu	att Ile	cat His	ttg Leu	atc Ile 1220	aaa Lys	tca Ser	gag Glu	cac His	gca Ala 1225	aaa Lys	ccg Pro	ctc Leu		4184
ccg Pro	gca Ala	tgg Trp	ctt Leu	tcg Ser	ttg Leu	tgg Trp	aaa Lys	gaa Glu	gga Gly	acg Thr	gag Glu	tct Ser	tca Ser	tat Tyr		4229

10297.204.ST25.txt

1230 1235 1240

gat gaa tat caa ggc gct gga aga cat gat gaa atg ctt gcg gac 4274
 Asp Glu Tyr Gln Gly Ala Gly Arg His Asp Glu Met Leu Ala Asp
 1245 1250 1255

ggc ttt gtt aaa agc aac gca gat ctc atc aga cag att ttg ggc 4319
 Gly Phe Val Lys Ser Asn Ala Asp Leu Ile Arg Gln Ile Leu Gly
 1260 1265 1270

gaa cgt gcc gct gta atc gga ggt gca tgatgcatga acgagatcat 4366
 Glu Arg Ala Ala Val Ile Gly Gly Ala
 1275 1280

taagcagttt ggagcgccgg caagcggtat gcagttgatc tgtttcccgt ttgccggggg 4426
 atattcggca tcattcagac cgcttcacga acatttataaa acagattttg atatgctggc 4486
 gatcgaaccg cctggacacg gcacaaatcg aatggcgctt gtcgacaatt tggaaaagct 4546
 cgccgatttg tatatagcgg cgcttaagcc gcggctttcc tctcaattcg tgctgttcgg 4606
 ccacagtatg ggcggcatgg ttgtttacag gctggcgcaa aagcttgaac aagaagggat 4666
 ctttccggca gccgctgtga tatcagcgat acagccgccc catattcagc ggcaaaaggt 4726
 gtctcaccaa aaggatgacg ctttctcga ccatctcatt cagcttggcg gaatacccaa 4786
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<210> 18
 <211> 1282
 <212> PRT
 <213> Bacillus licheniformis

<400> 18

Leu Ser Gln Phe Lys Lys Glu His Val Gln Asp Ile Tyr Tyr Leu Ser
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Pro Met Gln Glu Gly Met Leu Phe His Thr Leu Leu His Pro Gly Gln
 20 25 30

Gly Phe Tyr Ile Glu Gln Ile Ser Met Gln Val Lys Gly Ser Phe Gln
 35 40 45

Lys Asp Val Leu Glu Lys Ser Met Asn Val Ile Ile Gly Arg Tyr Asp
 50 55 60

Ile Phe Arg Thr Val Phe Val His Glu Lys Met Lys Arg Pro Val Gln
 65 70 75 80

Val Val Leu Lys Glu Arg Ser Phe Gln Ala Glu Glu Ile Asp Leu Ser
 85 90 95

Gly Leu Ser Glu Ala Glu Gln Asn Glu Arg Ile Glu Asp Tyr Lys Arg
 100 105 110

Lys Asp Lys Glu Lys Gly Phe Asn Leu Ser Lys Asp Ile Pro Met Arg
 115 120 125

10297.204.ST25.txt

Thr Ala Val Phe Lys Lys Gly Gln Asp Arg Tyr Glu Trp Val Trp Ser
 130 135 140

Tyr His His Ile Leu Leu Asp Gly Trp Cys Phe Gly Ile Val Val Gln
 145 150 155 160

Glu Leu Phe Glu Val Tyr Asn Ala Leu Arg Glu Asn Arg Pro Tyr Ser
 165 170 175

Leu Gly Pro Val Arg Pro Tyr Lys Glu Tyr Ile Lys Trp Leu Glu Ser
 180 185 190

Gln Asp Lys Gln Lys Ser Leu Val Tyr Trp Glu His His Leu Ala Gly
 195 200 205

Phe Glu Gly Gln Thr Thr Phe Ser Glu Gln Arg Lys Asn Pro Glu Gln
 210 215 220

Ala Gly Asn Gln Pro Glu Glu Leu Leu Phe Thr Leu Pro Lys Glu Asp
 225 230 235 240

Thr Glu Ala Phe Thr Gln Leu Ala Lys Ala His His Thr Thr Leu Ser
 245 250 255

Thr Ala Leu Gln Ala Val Trp Ser Val Leu Leu Ser Arg Tyr Gln Arg
 260 265 270

Ser Arg Asp Leu Ile Phe Gly Thr Val Val Ser Gly Arg Pro Ala Asp
 275 280 285

Ile Gln Gly Val Glu His Met Val Gly Leu Phe Ile Asn Val Val Pro
 290 295 300

Lys Arg Ala Thr Phe Gly Pro Gln Thr Thr Phe Thr Glu Leu Val Ala
 305 310 315 320

Asp Leu Gln Lys Gln Ala Leu Glu Ala Glu Pro His Gln Tyr Val Pro
 325 330 335

Leu Tyr Glu Ile Gln Ser His Ile Ala Ala Pro Asn Leu Ile Asp His
 340 345 350

Ile Ile Val Phe Glu Asn Tyr Pro Leu Gln Glu Ala Asn Lys Gln Gln
 355 360 365

Lys Glu Lys Asn Leu Gly Phe Thr Met Asp Glu Ile Ser Val Phe Glu
 370 375 380

Lys Ser Asn Tyr Asp Leu Asn Leu Leu Ala Ser Pro Gly Glu Glu Met
 385 390 395 400

10297.204.ST25.txt

Met Leu Lys Leu Ala Tyr Asn Arg Asn Ile Phe Glu Pro Ser Phe Ile
405 410 415

Leu Arg Leu Lys Glu Gln Leu Leu Thr Ala Ile Arg Glu Val Ile Arg
420 425 430

Asp Pro Glu Gln Pro Leu Asp Asp Ile Cys Val Val Ser Lys Lys Glu
435 440 445

Lys Glu Arg Leu Leu His Glu Phe Asn Gly Gln Val Gln Arg Lys Gln
450 455 460

Ile Gly Leu Thr Ile Pro Gln Trp Phe Glu Gln Tyr Ala Glu Ala Leu
465 470 475 480

Pro Glu Lys Pro Ala Val Ser Ala Ala Gly Arg Thr Leu Thr Tyr Arg
485 490 495

Glu Leu Asn Glu Lys Ala Asn Lys Val Ala His Leu Leu Arg Lys Lys
500 505 510

Asn Val Gly Arg Gly Glu Pro Val Ala Leu Leu Phe Arg Arg Ser Pro
515 520 525

Glu Met Val Ile Ala Ile Leu Ala Val Leu Lys Ala Gly Gly Ala Tyr
530 535 540

Leu Pro Ile Asp Pro Glu Tyr Pro Glu Ala Arg Ile Gln Tyr Met Leu
545 550 555 560

Glu Asp Ser Gly Ala Val Cys Met Leu Thr Gln Glu Glu Leu Ala Gly
565 570 575

Arg Ala Ala Ser Leu Ser Phe His Lys His Thr Ile Leu Ile Asp Asp
580 585 590

Pro Ala Val Ser Ala Glu Ser Gly Arg Asn Leu Glu Ile Ala Ala Glu
595 600 605

Pro Asp Asp Leu Ala Tyr Ile Met Tyr Thr Ser Gly Thr Thr Gly Lys
610 615 620

Pro Lys Gly Asn Leu Thr Thr His Ala Asn Ile Thr Arg Val Val Lys
625 630 635 640

Glu Thr Asn Tyr Ile Ser Leu Ser Glu Lys Asp Thr Leu Leu Ser Leu
645 650 655

Ser Asn Tyr Ala Phe Asp Gly Phe Thr Phe Asp Leu Tyr Gly Ala Leu
660 665 670

10297.204.ST25.txt

Leu Asn Gly Ala Lys Leu Val Val Ala Asp Gln Ala Thr Ile Leu His
 675 680 685

Ile Gly Lys Leu Thr Glu Ala Ile Gln Lys Glu Asn Ile Thr Val Met
 690 695 700

Phe Val Thr Thr Ala Leu Phe Asn Leu Leu Val Asp Ala Gly Thr Gly
 705 710 715 720

Trp Met Lys Gly Ile Arg Lys Val Leu Phe Gly Gly Glu Arg Ser Ser
 725 730 735

Val Ser His Val Lys Lys Ala Phe Ala Ala Met Gly Pro Asp Arg Ile
 740 745 750

Ile His Val Tyr Gly Pro Thr Glu Thr Thr Val Phe Ala Thr Phe Tyr
 755 760 765

Pro Val Asn Arg Met Glu Asp Ser Ala Val Ser Ile Pro Ile Gly Lys
 770 775 780

Pro Ile Asn Glu Thr Asn Ala Tyr Ile Leu Thr Glu Asn Asn Arg Leu
 785 790 795 800

Gln Pro Ile Gly Ala Val Gly Glu Leu Cys Leu Ser Gly Thr Gly Val
 805 810 815

Ser Arg Gly Tyr Leu Asn Arg Pro Glu Leu Thr Ala Glu Lys Phe Ala
 820 825 830

Pro His Pro Phe Asn Ser Gly Glu Thr Met Tyr Arg Thr Gly Asp Leu
 835 840 845

Ala Arg Trp Leu Pro Asp Gly Asn Ile Asp Phe Ile Gly Arg Ile Asp
 850 855 860

Asp Gln Val Lys Ile Arg Gly His Arg Ile Glu Leu Gly Glu Ile Glu
 865 870 875 880

Glu Gln Leu Met Arg Cys Gln Gly Val Lys Glu Ala Val Val Thr Ala
 885 890 895

Arg Lys Ser Gly Asn Gly Asp Ala Ala Leu Thr Ala Tyr Val Val Pro
 900 905 910

Val Gln Gly Thr Glu Val Ala Asn Glu Glu Val Arg Arg Gln Leu Ala
 915 920 925

Arg Arg Leu Pro Ala Tyr Met Val Pro Ala Ala Tyr Ile Met Leu Glu
 930 935 940

10297.204.ST25.txt

Glu Leu Pro Leu Thr Ala Asn Gly Lys Val Asn Arg Arg Leu Leu Pro
 945 950 955 960
 Glu Ala Asp Gly Arg Pro Asn Ser Thr Glu Arg Arg Ala Pro Arg Asn
 965 970 975
 Ala Thr Glu Glu Lys Leu Ala Val Ile Trp Ser Glu Val Leu Gly Arg
 980 985 990
 Gln Gln Ile Gly Ile Asp Glu Asn Phe Phe Glu Ile Gly Gly His Ser
 995 1000 1005
 Leu Lys Ala Met Ala Val Ala Ser Arg Met Leu Lys Asp Leu Ala
 1010 1015 1020
 Ile Asp Val Pro Val Asn Val Leu Phe Glu Met Pro Thr Ile Glu
 1025 1030 1035
 Gly Leu Ala Ala Tyr Ile Asp Gln Gly Gly His Val Asp Glu Val
 1040 1045 1050
 Lys Lys Thr Val Phe Asn Gln Ala Ser Thr Arg His Leu Phe Ala
 1055 1060 1065
 Phe Pro Pro Val Leu Gly Tyr Gly Ile Met Tyr Gly Lys Leu Ala
 1070 1075 1080
 Glu Gln Met Pro Glu Tyr Arg Ile His Ala Phe Asp Phe Ile Glu
 1085 1090 1095
 Ser Asp Asp Arg Ala Val Arg Tyr Ala Glu Ala Ile Ser Asp Leu
 1100 1105 1110
 Gln Pro Glu Gly Pro Leu Thr Leu Ile Gly Tyr Ser Ala Gly Cys
 1115 1120 1125
 Gly Leu Ala Phe Glu Val Ala Gln Ala Leu Glu Lys Asn Gly Arg
 1130 1135 1140
 Lys Val Glu Lys Leu Leu Met Ile Asp Ser Tyr Met Lys Asn Asp
 1145 1150 1155
 Val Ser Asp Leu Glu Gly Arg Ser Ile Glu Ala Asp Thr Ala Ala
 1160 1165 1170
 Leu Met Glu Ala Asn Lys Asp Asn Glu Tyr Met Lys Ile Lys Thr
 1175 1180 1185
 Val Ala Asp Gly Ile Ala Lys Lys Met Thr Ala Tyr Tyr Ser Tyr
 1190 1195 1200

10297.204.ST25.txt

Phe Val Asn Leu Val His Gln Gly Thr Val Ser Ser Glu Ile His
1205 1210 1215

Leu Ile Lys Ser Glu His Ala Lys Pro Leu Pro Ala Trp Leu Ser
1220 1225 1230

Leu Trp Lys Glu Gly Thr Glu Ser Ser Tyr Asp Glu Tyr Gln Gly
1235 1240 1245

Ala Gly Arg His Asp Glu Met Leu Ala Asp Gly Phe Val Lys Ser
1250 1255 1260

Asn Ala Asp Leu Ile Arg Gln Ile Leu Gly Glu Arg Ala Ala Val
1265 1270 1275

Ile Gly Gly Ala
1280

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<211> 1678
<212> DNA
<213> Bacillus licheniformis

<220>
<221> CDS
<222> (501)..(1178)

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tcccgtttat tcggcagcaa atgccgcttg ggaaaaggcg tgtattcgct ttccctgtct 180
tttggagcca ctccgaccag cagcaattcc ggcacttcct gactcgaaaa cagcttttcg 240
attgagcgca gactgttgct gtatgccgga tcgaataaat ctcccagggtc atggacgtat 300
agaacgggat agcggttttc accgctcccg tatgaaggag gaagatagat caaaagctcc 360
ctcccgaagc atgtatcttt tatcaatgtt ccgtctatca tgttcattac tccattctgc 420
acaagtatca tgcctatctt tcctgctgtc tgtttgctaa aatgaaagca gaaaaatattc 480
atgtgaagag gttgcgtttg atg aag att tac gcc gtt tat atg gat cag ctg 533
Met Lys Ile Tyr Ala Val Tyr Met Asp Gln Leu
1 5 10
ccg gaa gcc ggt caa ttt aac cga atg atg gcc atg gtg tct gaa gaa 581
Pro Glu Ala Gly Gln Phe Asn Arg Met Met Ala Met Val Ser Glu Glu
15 20 25
aag cga aaa aaa gtg ggc aga tac aga tat ccc gaa gat gcc agc cgg 629
Lys Arg Lys Lys Val Gly Arg Tyr Arg Tyr Pro Glu Asp Ala Ser Arg
30 35 40
acg ctg atc gga gaa gtg ctg gcg agg cac atc atc agc gaa acg ttt 677
Thr Leu Ile Gly Glu Val Leu Ala Arg His Ile Ile Ser Glu Thr Phe
45 50 55

10297.204.ST25.txt

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cat ttg ccg aat gag cag atc cgt ttt aca gaa gga agg tac ggc aaa      725
His Leu Pro Asn Glu Gln Ile Arg Phe Thr Glu Gly Arg Tyr Gly Lys
60                               65                               70                               75

ccg gct gct gaa ggt ctg aac gac ttt cat ttc aac att tcc cac tcc      773
Pro Ala Ala Glu Gly Leu Asn Asp Phe His Phe Asn Ile Ser His Ser
80                               85                               90

gga aaa tgg atc gtg tgc gga gcc ggc gcg cag ccg atc gga gtg gat      821
Gly Lys Trp Ile Val Cys Gly Ala Gly Ala Gln Pro Ile Gly Val Asp
95                               100                               105

gtc gaa aag atc aag ccg atc aat ttc gac att gcc aaa cgg ttt ttt      869
Val Glu Lys Ile Lys Pro Ile Asn Phe Asp Ile Ala Lys Arg Phe Phe
110                               115                               120

tca cct tcc gag cac gat gat ctc atg gaa aag gac gaa tca gaa cgc      917
Ser Pro Ser Glu His Asp Asp Leu Met Glu Lys Asp Glu Ser Glu Arg
125                               130                               135

ctg tcg tat ttc tat cat ttg tgg acg atg aaa gaa agc ttt att aaa      965
Leu Ser Tyr Phe Tyr His Leu Trp Thr Met Lys Glu Ser Phe Ile Lys
140                               145                               150                               155

cag gcg gga aaa ggc ctg tct ctg ccg ctt gat tcc ttc tcc gtc aaa      1013
Gln Ala Gly Lys Gly Leu Ser Leu Pro Leu Asp Ser Phe Ser Val Lys
160                               165                               170

ctg aac gaa cag ggg cga gct tcg gtg gaa act ccc ccc ggc tat ccg      1061
Leu Asn Glu Gln Gly Arg Ala Ser Val Glu Thr Pro Pro Gly Tyr Pro
175                               180                               185

cct tgc tat ata caa gcc tat gaa att gac ccc ggc tat aaa atg gcg      1109
Pro Cys Tyr Ile Gln Ala Tyr Glu Ile Asp Pro Gly Tyr Lys Met Ala
190                               195                               200

gtg tgt tcc gcc gca cct gaa ttt ccc ggc cgg att gtg atg aaa agc      1157
Val Cys Ser Ala Ala Pro Glu Phe Pro Gly Arg Ile Val Met Lys Ser
205                               210                               215

tgc gct gaa ctg tca atg ctt taaaaagtcc cgccctaaaa ataagcggtt      1208
Cys Ala Glu Leu Ser Met Leu
220                               225

tccaccgctt gccgcaaccg ctcgatgccg ctgcggatgt cctcttcctt cacattggac      1268

gtattgattt tcaatagatt tcttttttga aaagccggca tataatgagc gttgaccggt      1328

tcgagcagga cgtcccgctt ttgtaggctt ttaatcagac gggatgccgg gatcgtccgg      1388

tccaattcaa tatgggtgtg gatagccggc tgtgcgggag gatgaaattc aaacacatcc      1448

cctagagacg cggaacattc ttttagcaga tcatgcagaa ggcatgatct tttttgatag      1508

gaagaacgga tcttttgctt atgcttttca aacatcccg ctttcaaata gatctccaaa      1568

gcggcctgag acagcatgga actgtcaatg tcgagcagct gtttgtaccg gttgaacaca      1628

attgtcagag aatcggggcag cacggcggt ccgacccgca gacccggaaa      1678

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<211> 226
<212> PRT
<213> Bacillus licheniformis
<400> 20

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10297.204.ST25.txt

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Phe Asn Arg Met Met Ala Met Val Ser Glu Glu Lys Arg Lys Lys Val
 20 25 30

Gly Arg Tyr Arg Tyr Pro Glu Asp Ala Ser Arg Thr Leu Ile Gly Glu
 35 40 45

Val Leu Ala Arg His Ile Ile Ser Glu Thr Phe His Leu Pro Asn Glu
 50 55 60

Gln Ile Arg Phe Thr Glu Gly Arg Tyr Gly Lys Pro Ala Ala Glu Gly
 65 70 75 80

Leu Asn Asp Phe His Phe Asn Ile Ser His Ser Gly Lys Trp Ile Val
 85 90 95

Cys Gly Ala Gly Ala Gln Pro Ile Gly Val Asp Val Glu Lys Ile Lys
 100 105 110

Pro Ile Asn Phe Asp Ile Ala Lys Arg Phe Phe Ser Pro Ser Glu His
 115 120 125

Asp Asp Leu Met Glu Lys Asp Glu Ser Glu Arg Leu Ser Tyr Phe Tyr
 130 135 140

His Leu Trp Thr Met Lys Glu Ser Phe Ile Lys Gln Ala Gly Lys Gly
 145 150 155 160

Leu Ser Leu Pro Leu Asp Ser Phe Ser Val Lys Leu Asn Glu Gln Gly
 165 170 175

Arg Ala Ser Val Glu Thr Pro Pro Gly Tyr Pro Pro Cys Tyr Ile Gln
 180 185 190

Ala Tyr Glu Ile Asp Pro Gly Tyr Lys Met Ala Val Cys Ser Ala Ala
 195 200 205

Pro Glu Phe Pro Gly Arg Ile Val Met Lys Ser Cys Ala Glu Leu Ser
 210 215 220

Met Leu
 225

<210> 21
 <211> 1738
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<221> CDS

<222> (501)..(1238)

<400> 21

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atgtcagcga tttagaaggg cggtcaattg aagccgatac ggccgccttg atggaagcca      180
acaaggacaa tgaatatatg aaaatcaaga cggttgccga tggcatcgct aaaaagatga      240
cagcctatta ttcttacttt gtcaatcttg tccatcaagg aacggtcagc tcggagattc      300
at ttgatcaa atcagagcac gcaaaaccgc tcccggcatg gctttcgttg tggaaagaag      360
gaacggagtc ttcatatgat gaatatcaag gcgctggaag acatgatgaa atgcttgcgg      420
acggctttgt taaaagcaac gcagatctca tcagacagat tttgggcgaa cgtgccgctg      480
taatcggagg tgcgatgatgc atg aac gag atc att aag cag ttt gga gcg ccg      533
                        Met Asn Glu Ile Ile Lys Gln Phe Gly Ala Pro
                        1                               5                               10

gca agc ggt atg cag ttg atc tgt ttc ccg ttt gcc ggg gga tat tcg      581
Ala Ser Gly Met Gln Leu Ile Cys Phe Pro Phe Ala Gly Gly Tyr Ser
                        15                               20                               25

gca tca ttc aga ccg ctt cac gaa cat tta aaa aca gat ttt gat atg      629
Ala Ser Phe Arg Pro Leu His Glu His Leu Lys Thr Asp Phe Asp Met
                        30                               35                               40

ctg gcg atc gaa ccg cct gga cac ggc aca aat cga atg gcg ctt gtc      677
Leu Ala Ile Glu Pro Pro Gly His Gly Thr Asn Arg Met Ala Leu Val
                        45                               50                               55

gac aat ttg gaa aag ctc gcc gat ttg tat ata gcg gcg ctt aag ccg      725
Asp Asn Leu Glu Lys Leu Ala Asp Leu Tyr Ile Ala Ala Leu Lys Pro
60                               65                               70                               75

cgg ctt tcc tct caa ttc gtg ctg ttc ggc cac agt atg ggc ggc atg      773
Arg Leu Ser Ser Gln Phe Val Leu Phe Gly His Ser Met Gly Gly Met
                        80                               85                               90

gtt gtt tac agg ctg gcg caa aag ctt gaa caa gaa ggg atc ttt ccg      821
Val Val Tyr Arg Leu Ala Gln Lys Leu Glu Gln Glu Gly Ile Phe Pro
                        95                               100                               105

gca gcc gct gtg ata tca gcg ata cag ccg ccc cat att cag cgg caa      869
Ala Ala Ala Val Ile Ser Ala Ile Gln Pro Pro His Ile Gln Arg Gln
                        110                               115                               120

aag gtg tct cac caa aag gat gac gca ttt ctc gac cat ctc att cag      917
Lys Val Ser His Gln Lys Asp Asp Ala Phe Leu Asp His Leu Ile Gln
                        125                               130                               135

ctt ggc gga ata ccc aaa gaa ctg gca gag cac agg gaa atg atg aac      965
Leu Gly Gly Ile Pro Lys Glu Leu Ala Glu His Arg Glu Met Met Asn
140                               145                               150                               155

ttt ttc ctg cct tcg ttc aga gcg gac tac aga gcg ctt gag acg ttc      1013
Phe Phe Leu Pro Ser Phe Arg Ala Asp Tyr Arg Ala Leu Glu Thr Phe
                        160                               165                               170

tgc cat acc gat cat acg ccg ctt aga tcg cct gtg cat att ctg aac      1061
Cys His Thr Asp His Thr Pro Leu Arg Ser Pro Val His Ile Leu Asn
                        175                               180                               185

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10297.204.ST25.txt

gga gac cgc gat gag aaa tgc atg agg gat gcg ctt ggc tgg aaa aag 1109
 Gly Asp Arg Asp Glu Lys Cys Met Arg Asp Ala Leu Gly Trp Lys Lys
 190 195 200

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 Trp Ala Asn Thr Ile Asp Phe His Tyr Phe Lys Gly Gly His Met Tyr
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 Leu Leu Ser Glu Thr Glu Gln Val Ala Ala Lys Leu Lys Thr Ile Ala
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gcg gcc agc cgc agt acg gct gtt ccg aca atg taaagaaagc ggaaaatcgg 1258
 Ala Ala Ser Arg Ser Thr Ala Val Pro Thr Met
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Leu Ile Cys Phe Pro Phe Ala Gly Gly Tyr Ser Ala Ser Phe Arg Pro
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Leu His Glu His Leu Lys Thr Asp Phe Asp Met Leu Ala Ile Glu Pro
 35 40 45

Pro Gly His Gly Thr Asn Arg Met Ala Leu Val Asp Asn Leu Glu Lys
 50 55 60

Leu Ala Asp Leu Tyr Ile Ala Ala Leu Lys Pro Arg Leu Ser Ser Gln
 65 70 75 80

Phe Val Leu Phe Gly His Ser Met Gly Gly Met Val Val Tyr Arg Leu
 85 90 95

Ala Gln Lys Leu Glu Gln Glu Gly Ile Phe Pro Ala Ala Ala Val Ile
 100 105 110

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Ser Ala Ile Gln Pro Pro His Ile Gln Arg Gln Lys Val Ser His Gln
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Lys Asp Asp Ala Phe Leu Asp His Leu Ile Gln Leu Gly Gly Ile Pro
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Lys Glu Leu Ala Glu His Arg Glu Met Met Asn Phe Phe Leu Pro Ser
 145 150 155 160

Phe Arg Ala Asp Tyr Arg Ala Leu Glu Thr Phe Cys His Thr Asp His
 165 170 175

Thr Pro Leu Arg Ser Pro Val His Ile Leu Asn Gly Asp Arg Asp Glu
 180 185 190

Lys Cys Met Arg Asp Ala Leu Gly Trp Lys Lys Trp Ala Asn Thr Ile
 195 200 205

Asp Phe His Tyr Phe Lys Gly Gly His Met Tyr Leu Leu Ser Glu Thr
 210 215 220

Glu Gln Val Ala Ala Lys Leu Lys Thr Ile Ala Ala Ala Ser Arg Ser
 225 230 235 240

Thr Ala Val Pro Thr Met
 245